

MILITARY OPERATIONS ON URBANIZED TERRAIN (MOUT) PART II - DEFENSE

Subcourse Number IN0736

EDITION B

United States Army Infantry School
Fort Benning, Georgia 31905-5593

6 Credit Hours

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SUBCOURSE OVERVIEW

We designed this subcourse to teach you to perform specific tasks required in planning for and conducting defensive operations on urbanized terrain.

There are no prerequisites for this subcourse.

This subcourse reflects the doctrine which was current at the time it was prepared. In your own work situation, always refer to the latest official publications.

Unless otherwise stated, the masculine gender of singular pronouns is used to refer to both men and women.

TERMINAL LEARNING OBJECTIVE

ACTION: Conduct Intelligence Preparation Of the Battlefield (IPB) on urban terrain.

Explain Threat doctrine for conducting an attack on urban terrain.

Explain the employment capabilities and limitations of combat, combat support, and combat service support assets available to a battalion task force engaged in MOUT defense.

Explain U.S. doctrine on planning a MOUT defense.

CONDITION: Given extracts of doctrinal literature, a tactical situation of a battalion TF S3, and a series of multiple-choice questions relating to Threat force offensive doctrine.

STANDARD: To demonstrate competency of this task, you must achieve a minimum of 70% on the subcourse examination.

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References:

[FM 34-130](#) Intelligence Preparation of the Battlefield, May 1989.

[FM 90-10-1](#) An Infantryman's Guide to Combat In Built-Up Areas, May 1993.

[FM 100-2-2](#) The Soviet Army: Specialized Warfare and Rear Area Support, July 1984.

Use the above publication extracts to take this subcourse. At the time we wrote this subcourse, these were the current publications. In your own work situation, always refer to the latest publications.

LESSON 1

CONDUCT INTELLIGENCE PREPARATION OF THE BATTLEFIELD (IPB) ON URBAN TERRAIN

OVERVIEW

LESSON DESCRIPTION:

In this lesson you will learn to perform a specific task required in planning for and conducting a defensive operation on urbanized terrain.

TERMINAL LEARNING OBJECTIVE:

ACTION: Conduct Intelligence Preparation Of The Battlefield (IPB) On Urban Terrain.

CONDITION: Given extracts of doctrinal literature, a tactical situation for a battalion TF S3, and a series of multiple-choice questions relating to Threat force offensive doctrine.

STANDARD: To demonstrate competency of the task, you must achieve a minimum of 70% on the subcourse examination.

REFERENCES: The material contained in this lesson was derived from the following publications: [FM 34-130](#), [FM 90-10-1](#), and FM 100-2-2.

INTRODUCTION

Intelligence preparation of the battlefield (IPB) is key to all operations conducted in built-up areas--intelligence is an important part of every combat decision. To succeed as fighters in built-up areas, commanders and leaders must know the nature of built-up areas. They must analyze its effect on both enemy and friendly forces. The focus of the material presented will be on those issues of urban analysis that commanders and their staffs must be aware of before conducting the IPB process.

INTELLIGENCE PREPARATION OF THE BATTLEFIELD IN THE URBAN BATTLE.

1. Friendly and enemy doctrines recommend avoiding combat in built-up areas. War in Europe, Korea, or any other heavily populated area inevitably requires combat in cities. In many cases, large urban areas cover major lines of communication, or sit astride main supply routes. These urban areas will have to be attacked or taken to further the advance or to effect the continual flow of supplies. Political rather than military considerations may dictate the methods employed in the effort.
2. Additionally, the increasing focus on operations other than war (OOTW), urban terrorism, and civil disorder adds to the realization that more attention must be given to urban combat. This is especially true in the case of urban insurgency, which has become a well-organized strategy. Urban insurgencies

currently being carried out in various parts of the world are causing serious problems for the authorities; they have forced the militaries to develop new strategies to cope with this growing problem. The refinement of IPB doctrine to include operations other than war including urban combat operations is a direct result of our realization of the actual situations that will be encountered.

3. The requirements for combat in built-up areas create a variety of troop control, maneuver, and equipment utilization problems. Urban combat also imposes a number of demands that are different from ordinary field conditions. These specific demands include requirements for:

- a. Larger forces.
- b. A slower pace and tempo of operations, and an increase in methodical, synchronized operations.
- c. A longer duration of commitment.
- d. Longer preparatory and counter-preparatory fires.
- e. Almost constant communications between individual forces.

4. Urban defensive operations and insurgent and terrorist actions depend on the holding or attack of critical areas. During actual combat these critical sites provide stability for the defense and are the basis for freedom of maneuver. Insurgents and terrorists rely on such areas to provide a basis for further operations and to spread counterterrorist or counterinsurgent forces over a wider area. No matter which situation applies, combat in urban terrain is expected to break down into a number of small-unit battles fought by battalions, companies, platoons, and squads or small assault groups in confined areas. These conditions create:

- a. The requirement to fight small-scale engagements which inhibits centralized control and forces independent action by small unit leaders. This especially impacts on the former Soviet preference for close centralized control and large-scale operations.
- b. The problem of training small units for combat in urban areas and other inherent and probably unanticipated difficulties is maintaining morale.
- c. Confined spaces which limit observation, fields of fire (FofF), and maneuver.
- d. The inability to maneuver which prevents the concentration of fire maneuver elements at critical points.
- e. A greater demand for ammunition and rations, thus imposing unusual strains on logistics elements.
- f. Problems with conducting effective reconnaissance during conventional operations.

Reconnaissance by force becomes the most effective reconnaissance means. This method involves probing a defense with successively larger units until the enemy positions are disclosed and can be successfully attacked. During unconventional operations, the opposite is true. Reconnaissance and security (R&S) are easily accomplished by both sides and may be unstoppable.

- g. Limitations in the ability to employ maximum combat power. Effective employment of firepower may be limited by the requirement to minimize damage. The terrain in the urban area can be expected to change during the battle, thereby complicating terrain analysis efforts. Urban terrain provides many small unit infiltration and movement routes which would not be considered during open area combat.
 - h. Situations in which small unit defensive positions can slow or stop the advance of a considerably larger force, and will require disproportionate efforts to be reduced.
5. All of these problems are expected to have a significant impact on the IPB process. Battlefield area analysis will assume an entirely different focus. The normal terrain evaluation process will require significant modification. Most weather factors will have less impact on operations. However, light data will assume a much greater importance. Familiar Threat doctrine will not apply to urban terrain and weapons system capabilities will be seriously degraded. The extreme potential for diversity in applying doctrine to urban terrain increases the difficulty of developing situation and event templates. The slower pace, smaller size, and increased numbers of operations will reduce or negate the effectiveness of time phasing. In addition, the matrix of streets makes the identification of target areas of interest (TAIs) and decision points (DPs) extremely difficult. The composition of the built-up area will determine how the IPB effort must be focused. A city with a major commercial area and multi-story buildings will require a significantly different focus than a town of single-story residences or a major industrial and rail center.

BATTLEFIELD AREA EVALUATION

1. Battlefield area evaluation for the urban battle involves the analysis of the urban area and a definition of the actual area to be considered. Questions to consider are:
 - a. Is the mission offensive or defensive?
 - b. Is the Area of Operation (AO) a typical European town with narrow streets, circular configuration, and low-terrain location?
 - c. Is the AO a Korean city with cities within a city, terrain-covering sprawl, and outlying industrial areas; or a major commercial, railroad, and navigation center with urban sprawl, and numerous light and heavy industries?
 - d. Is the threat a conventional force, an urban insurgency, a terrorist group, or a guerrilla war that has spread to the urban area?
 - e. What are the political considerations of the operation?
2. Built-up areas are normally classified by size. The former Soviets also classify cities by size and include the estimated perimeter of the city. US doctrine for classification also includes the built-up areas which form the connecting links between villages and towns. These strip areas are found along lines of communication (LOCs). [Figure 1-1](#) shows both the US and the former Soviet urban area classification criteria.

US		
SIZE	POPULATION	
Large City	over 100,000	
Towns and Small Cities	3,000 to 100,000	
Villages	less than 3,000	
SOVIET		
SIZE	POPULATION	ESTIMATED PERIMETER
Large	100,000 or more	25km +
Average	50,000 to 100,000	15 to 25km
Small	Less than 50,000	less than 15km

Figure 1-1. US and the former Soviet urban area classification criteria.

3. In addition to being classified by size, areas within cities and towns are classified by individual building and street layout patterns. These patterns have been categorized into five basic layouts which recur consistently throughout Europe, and which have parallels in Korea, Japan, and the Middle East. The five patterns are:
 - a. Dense, random construction.
 - b. Closed-orderly block.
 - c. Dispersed residential area.
 - d. High-rise area.
 - e. Industrial or transportation.
4. Dense, random construction is the typical old inner-city pattern. Narrow winding streets radiate from a central area in an irregular manner. Buildings are closely located and frequently are close to the edge of the roadway. This pattern is found in cities, towns, and villages throughout Europe and Korea.
5. The closed-orderly block pattern is common to the central areas of towns and cities. Wider streets generally form rectangular patterns. Buildings frequently form a continuous front along commercial areas in Europe, this pattern will likely be interspersed with light industrial or high-rise areas in Korea and Japan.
6. The dispersed residential area is normally contiguous to close-orderly block areas in Europe. The pattern consists of row houses or single-family dwellings with yards, gardens, trees, and fences. Street patterns are normally rectangular or curving. Such areas are limited to upper-class areas in oriental cities and towns.
7. The high-rise area is typical of modern construction in larger cities and towns. It consists of multi-storied apartments, separated open areas, and single-story buildings. Wide streets are laid out in rectangular patterns. These areas are often contiguous to industrial or transportation areas or interspersed with closed-orderly block areas.
8. Industrial or transportation areas are generally located on or along major rail and highway routes in urban complexes. Older complexes may be located within dense, random constructions or closed-

orderly block areas. New construction normally consists of low, flat-roofed factory and warehouse buildings. High-rise areas providing housing for workers are normally located adjacent to these areas throughout the orient. Identification of transportation facilities within these areas is critical. These facilities, especially rail facilities, pose significant obstacles to military movement.

9. The AO in urban warfare, like the normal AO, is assigned by higher headquarters. Like the normal AO, it is defined by depth, frontage, and height (airspace). Unlike the normal area, it also includes underground operations. Sewers, basements, subways, and underground cisterns and reservoirs force an entirely different analytical focus. Tall buildings add a new dimension to airspace analysis, both from a perspective of the FofF they permit and their effects on aircraft and air defense operations.

10. The areas that interest the commander will still be based on the commander's concept of the operation and METT-T factors. However, the commander will have to alter his areas of interest to include access and withdrawal routes into and out of the built-up area. Particular attention should be directed to routes where withdrawal can be blocked by obstacles or by airlanded forces. The area should also include all potential underground routes into the commander's AO. This will preclude an enemy force from appearing in an area that has already been cleared.

11. The battlefield evaluation must include a detailed examination of the enemy force that is expected to be encountered. Operations against an enemy motorized rifle battalion (MRB) will differ significantly from operations against a light infantry, insurgent, or terrorist force. Each will require a different mix of forces and tactics. Urban guerilla and terrorists represent entirely different situations which require special techniques. The nature of the enemy, together with the political considerations involved, will determine how commanders will employ their forces in the urban environment.

12. Another primary consideration is that every city is different. Therefore, battlefield evaluation must be concerned with the specific characteristics of each urban area rather than the general nature of the AO. The evaluation must also consider that urban operations will reduce both friendly and enemy operational capabilities by inhibiting fire, maneuver, and jamming potential.

13. Finally, the evaluation must consider that in no other form of combat are the pressures of battle more intense. Continuous close combat, high casualties, and the fleeting nature of targets and fires from a frequently unseen enemy produce severe psychological strain and physical fatigue, particularly among soldiers and small unit leaders.

TERRAIN ANALYSIS

Terrain analysis for the urban battle differs significantly from that of open country. Although the five military aspects of terrain are still considered, the familiar rules of terrain analysis cannot be applied to the urban environment. The normal graphic terrain products, such as modified combined obstacle overlay (MCOO), with its depiction of NO-GO, SLOW-GO, key terrain, obstacles, and avenues of approach or mobility corridors, has no application to urban combat. Rather, it means that an MCOO must be developed for the urban battle, and the focus of the analysis of the terrain must be altered to consider the special implications of urban terrain.

SPECIAL CONSIDERATIONS

1. Military maps, normally the basic tactical terrain analysis tool, do not provide sufficient detail for urban terrain analysis. Military maps also have too small a scale and are normally too outdated to be useful for purposes more detailed than general urban pattern analysis. Standard city maps are the basic tool of urban terrain analysis. However, urban terrain is dynamic. Towns and cities are constantly growing, adding new structures and demolishing existing structures. Therefore, any map of an urban area, including city maps or plans published by the city, state, or national government, will be inaccurate and obsolete to some degree. As such, photo-mosaics should be constructed for use in conjunction with or in lieu of city maps to support urban terrain analysis.
2. The nature of combat can radically alter the terrain in an urban area in a very short time. Incidental or intentional demolition of structures can change the topography of the area radically, quickly destroying reference points, creating obstacles to mobility, and providing the defenders with additional defensive positions. As urban areas grow, street patterns often change, presenting an attacking force with additional withdrawal routes to block with obstacles or maneuver elements and a defending force with additional withdrawal and reinforcement routes.
3. Maps and diagrams of sewer systems, subway systems, underground water systems, elevated railways, mass transit routes and utility generation, and holding and transmission facilities are important during urban operations. Sewer and subway systems provide covered infiltration and small unit approach routes. Elevated railways and mass transit routes provide mobility between city sectors, and point to locations where obstacles might be expected. Utility facilities are key targets for insurgents, urban guerrillas, and terrorists, and their destruction can hinder the capabilities of a defending force.
4. Certain public buildings must be identified during the terrain analysis phase of urban IPB. Hospitals are critical because the laws of war prohibit their attack when not being used for military purposes other than medical support. As command and control (C2) breaks down during urban operations, hospitals become an important source of medical support to combat forces. Platoons, squads, and individual fire teams will frequently be deprived of medical support, and the availability of civilian hospitals may determine whether or not injured personnel survive. The same is true during insurgency, urban guerilla, or terrorist actions. Knowledge of the location of civilian hospitals, clinics, and surgical facilities is critical in dealing with civilian and military casualties.
5. Stadiums, parks, sports fields, and school playgrounds are of high interest during both conventional and unconventional urban operations. These provide excellent civilian holding areas, interrogation centers, insurgent segregation areas, and enemy prisoner of war (EPW) holding facilities. These open areas also provide excellent helicopter landing sites which can be employed for air assault, medical evacuation, air insertion, and air-assisted C2. As these areas are often centrally located within a city or city district, they provide excellent logistic support areas and offer excellent air resupply possibilities.
6. Construction sites and commercial operations such as lumber yards, brick yards, steel yards, and railroad maintenance yards are of high interest, especially during unconventional operations. These serve as primary sources of obstacle construction materials when rubble is insufficient or not present.

They can also provide engineers with materials to strengthen existing rubble obstacles or with materials for antitank hedgehogs or crib-type roadblocks.

7. Public baths, swimming facilities, cisterns, and reservoirs are of special interest. They are especially useful in providing bathing facilities for combat personnel, thus helping to maintain morale in a situation which contributes to rapid morale deterioration. The conditions prevalent in urban combat often cause personnel to become dirtier more quickly than during combat in open areas. These facilities also provide an alternate water source when public utilities break down. Public latrines can also assist in morale maintenance, but are often connected to the utility systems which are the first to break down in conventional operations.

URBAN PATTERNS

The layout of an urban area will normally follow a definite pattern which is easily identified. Terrain analysts recognize three basic patterns and two basic subpatterns. The identification of the specific pattern or subpattern is an integral part of the urban terrain analysis process.

1. Hub Phenomenon. The hub or built-up area is central to any urban pattern. Although it may vary in size, the effects remain constant. The hub may serve as the pivot or anchor point for a defense, or as an element of a defense in-depth. The hub is an obstacle which blocks the attacker's advance. When terrain permits, the hub will normally be bypassed. As the attacking force slides off the leading edge of the hub, it becomes vulnerable to flank attacks and ambushes along the new axis of advance. Where adjacent terrain is unsuitable for bypass operations, the hub may be developed as a defensive strongpoint. Attack then requires a significant increase in forces and results in intensive combat in the built-up area. [Figure 1-2](#) shows an example of a hub phenomenon.

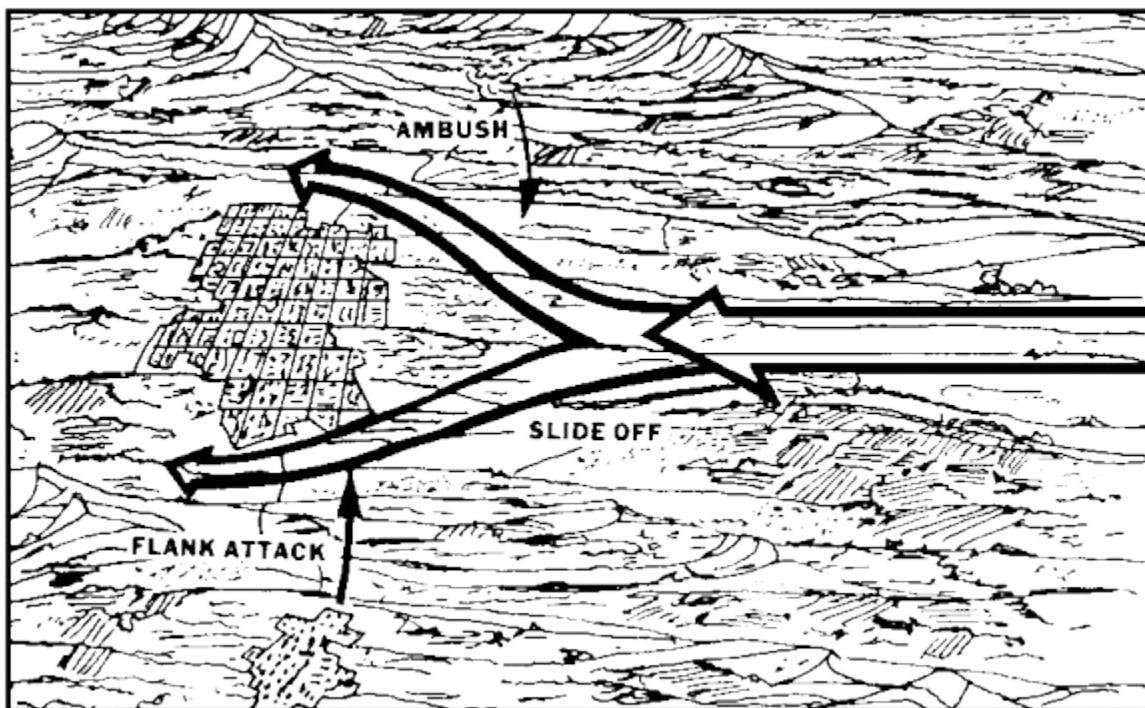


Figure 1-2. Example of a hub phenomenon.

2. Satellite Pattern. This pattern consists of a central hub and dependent, dispersed, smaller built-up areas with linear arrays along the connecting links. Links tend to focus on the central hub, with most taking the form of farm, forest, or secondary roads. Normally only a single main route will pass through the central hub. [Figure 1-3](#) shows an example of a satellite pattern. The pattern provides a mutual support situation for urban combat by providing:

- Resupply and evacuation routes for the defenders.
- Reinforcement routes for the defenders; avenues of approach or mobility corridors for the attackers.
- Mutually supporting defensive battle positions.
- Multiple exit links from the hub for the attacking force.

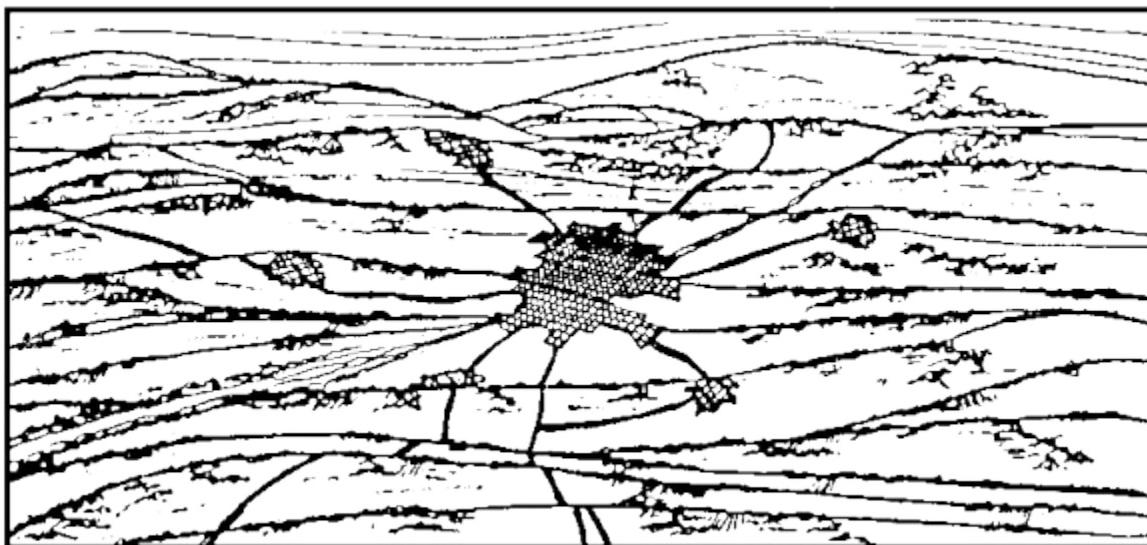


Figure 1-3. Example of a satellite pattern.

3. Network Pattern. This pattern is similar in appearance to the satellite pattern but is more complex and diverse. The pattern represents the interlocking of the primary hubs of satellite patterns. Formed primarily of towns and cities, its elements are more self-sufficient and less supportive of each other, although a dominant hub may exist. Major LOCs within a network are more extensive than in a satellite and may take on a rectangular rather than convergent form. The natural terrain within a network may be more varied than that contained in a single satellite array. The network pattern causes attacking units to have to fight through a maze of synthetic features that provide defensive obstacles. By-pass is difficult because contiguous terrain is often unsuitable for mounted operations. The pattern provides depth to the defense. [Figure 1-4](#) shows an example of a network pattern.

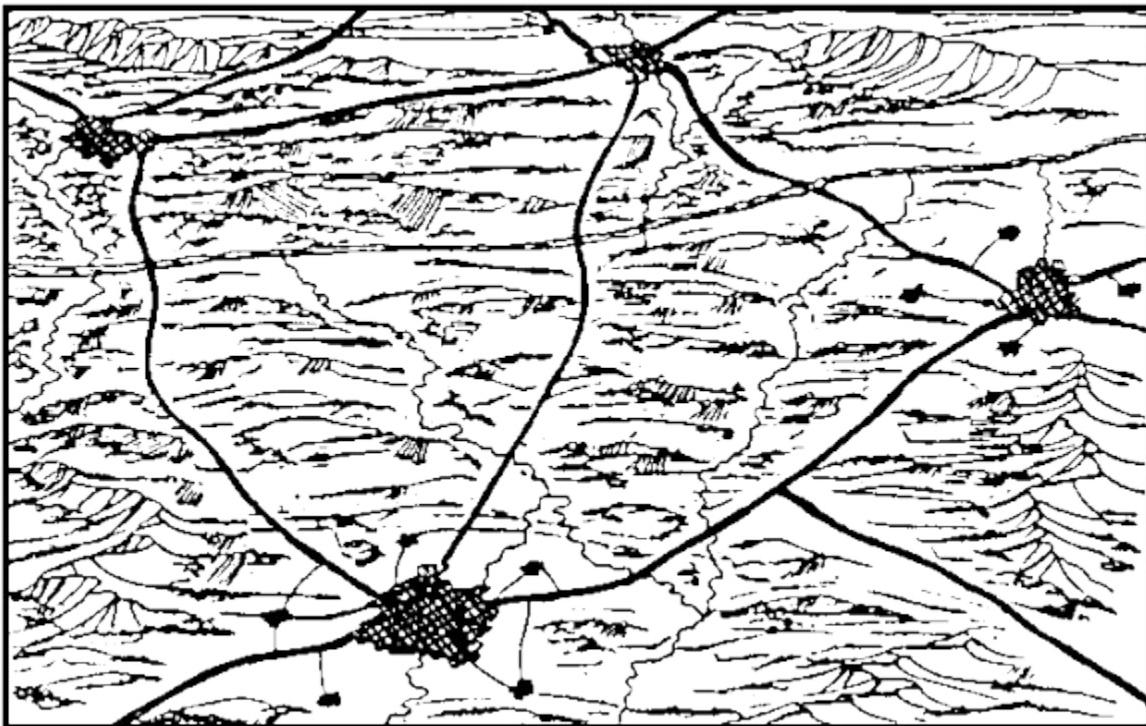


Figure 1-4. Example of a network pattern.

a. Linear Pattern. This pattern is a sub-element of the three basic patterns. The linear array may form one or more rays of the satellite pattern or the connecting links of a network. More frequently the basic array results from the stringing of minor hubs along a confined natural terrain corridor. This pattern facilitates the development of a series of strong defensive positions in-depth. It also acts to delay canalized forces and requires repeated deliberate attacks.

b. Segment or Pie-Slice Pattern. This pattern may occur as a subset of either the satellite or network patterns, or within a major hub. It is characterized by the splitting of an urban area by a dominant natural terrain feature such as a river or by synthetic features such as roads, railroads, and canals. The pattern may influence the assignment of boundaries and other control measures, or of attack objectives. The pattern may also bear directly on the organization of the terrain and on task organization. [Figure 1-5](#) shows an example of a segment or pie-slice pattern.

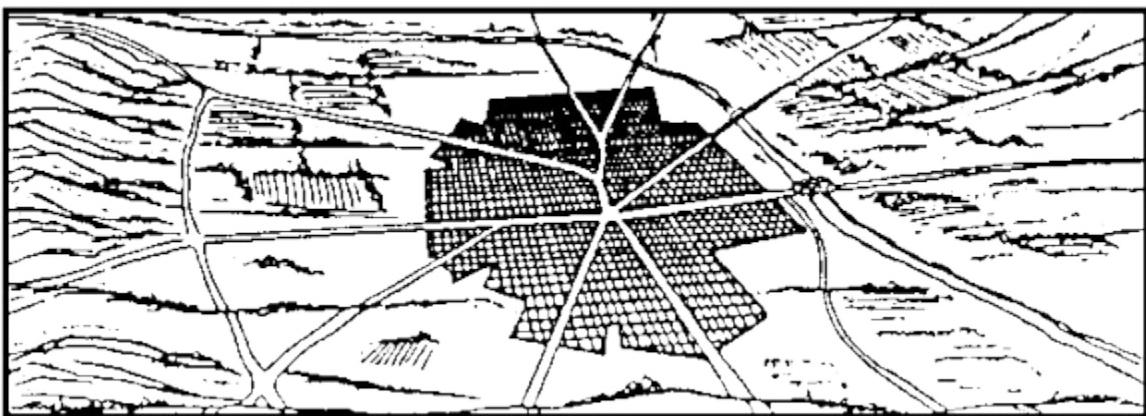


Figure 1-5. Example of a segment or pie-slice pattern.

PATTERN EFFECTS

In addition to the basic blocking action caused by the hub phenomenon, other effects can be associated with urban patterns.

1. The Funnel-Fan Effect. This normally occurs when the hub is located between terrain features that are unsuitable for mounted operations. Movement of units into the area results in the concentration of forces, a loss of offensive momentum, and canalization. Beyond the hub, forces are required to spread or fan out before full combat power can be developed. This favors the defense because it creates an accordion effect in units moving through the hub, reducing C2 and operating effectiveness. A similar effect occurs when an attacking force must penetrate an urban network on a narrow front between hubs. [Figure 1-6](#) shows an example of a funnel-fan effect.

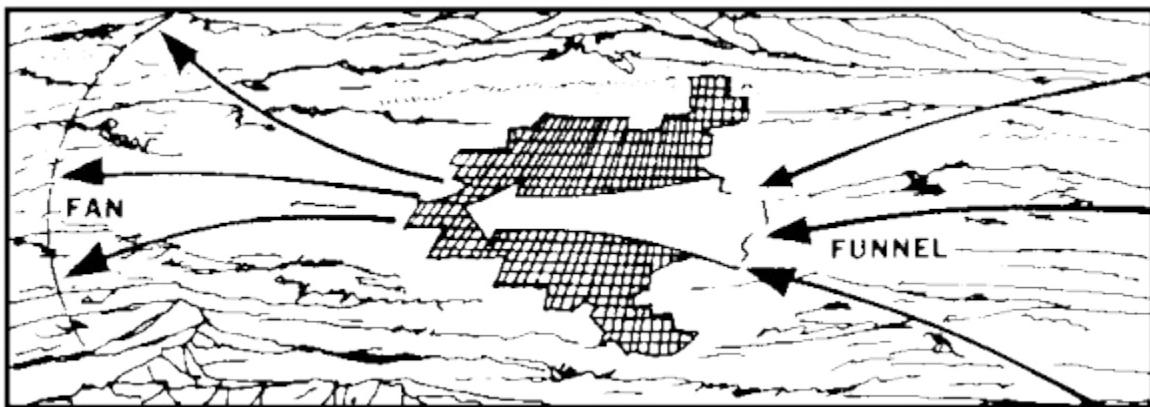


Figure 1-6. Example of a funnel-fan effect.

2. The Funnel Effect. Funneling or concentration and canalization of forces may occur without immediate fanning. This occurs most frequently when the linear pattern is encountered. It limits the number of maneuver units that may be applied against a series of hubs that must be confronted in succession, and forces a greater reliance on long-range and indirect fire weapons.

THE MILITARY ASPECTS OF TERRAIN

Urban terrain is analyzed by the five military aspects of terrain, the individual building and street layout pattern, and the echelon of the friendly unit. For example, a brigade may be concerned with an entire city, town, or city district, while battalions or task forces may be concerned with city blocks or even with individual buildings. The restrictive nature of urban terrain forces the analyst to be concerned with minimum rather than maximum weapons ranges, as some weapons that are highly effective in open country are unusable in urban areas. The five military aspects of terrain are discussed below according to the five street layout patterns.

1. Observation and Fields of Fire.

- a. Dense Random Construction. Weapons ranges and observation distances seldom extend more than 100 meters. Narrow streets limit tank turret traverse and do not allow for minimum antitank guided missile (ATGM) ranges. Buildings and narrow streets restrict the deployment of heavy direct-fire weapons. Short observation and FofF distances necessitate assigning small sectors to defending units.

- b. Closed-Orderly Block. Observation and FofF extend up to 350 meters and are sufficient for heavy direct-fire weapons and ATGMs in most areas. Streets and open areas permit the establishment of normal supporting fires. Indirect fire observation will be limited by numerous tall buildings and smoke.
- c. Dispersed Residential Areas. Weapons ranges are often reduced to less than 250 meters by winding streets. Straight streets sections often extend the weapons range. Buildings, hedges, bushes, walls, and other obstructions limit the effectiveness of small arms, ATGMs, and heavy direct-fire weapons. The defender can establish mutually supporting fires while the attacker cannot.
- d. High-Rise Areas. Mutually supporting fires can be established between buildings during both offensive and defensive operations. Maximum weapons ranges can be achieved by positioning weapons in the upper stories of buildings.
- e. Industrial or Transportation Areas. Quite often, these areas are situated on the outskirts of cities. Open areas provide excellent observation and FofF over the entire area, and facilitate the employment of close air support (CAS) and indirect fires. Smoke from burning fuel storage may hinder accurate fire direction.

2. Concealment and Cover.

- a. Dense, Random Construction. Buildings provide numerous concealed infantry positions and isolated armored vehicle positions. Thick masonry--stone and brick walls--offers excellent protection from direct fire. Adequate overhead protection is found only in basements, as most roofs, ceilings, and floors are constructed of wood or plaster. Underground systems offer excellent protection and often permit movement between battle positions.
- b. Closed-Orderly Block. Heavy construction provides excellent protection against direct and indirect fires. However, buildings selected for shelter must be evaluated for their ability to withstand collapse. Underground systems are normally extensive and provide storage areas, protection, and mobility.

Those underground systems not used must be blocked by either obstacles or maneuver elements. Advancing along open streets courts disaster and should be avoided whenever possible.

- c. Dispersed Residential Areas. Limited concealment and cover are provided by walls, fences, hedges, and houses. Overhead protection varies, but basement positions usually provide sufficient overhead cover. Construction often permits the concealment of, and provides limited cover for, armored vehicles.
- d. High-Rise Areas. High-rise structures provide protection from indirect fires, but only limited protection from direct fires. Concealment and cover are often not available unless adjacent buildings are secured. Attacking forces must employ heavy covering fire, smoke, and rapid movement to move from one building to another.

e. Industrial or Transportation Areas. Little concealment and cover are available in these areas due to the construction and the dispersed nature of the buildings. Some concealment is offered by buildings, but shed-type buildings should be avoided.

3. Obstacles.

- a. Dense, Random Construction. Narrow streets with buildings constructed directly on the street facilitate construction or creation of obstacles. Demolition of structures creates instant rubble obstacles.
- b. Closed-Orderly Block. The wider streets and heavy construction make rubble less of an obstacle. Obstacles are difficult to construct, but once constructed are difficult to reduce or bypass because of the relative ease by which they can be controlled by fire.
- c. Dispersed Residential Areas. Rubble is not a significant obstacle. Most obstacles in streets can be bypassed easily, but will reduce mobility to some degree.
- d. High-Rise Areas. Mines between buildings are the most effective obstacles. Rubble will not be a factor unless major structures are totally destroyed.
- e. Industrial or Transportation Areas. Railyards, elevated rail and roadways, ramps, loading docks, numerous high-tension lines, canals, overpasses, pipelines, and overhead obstructions such as cranes create significant obstacles to movement. Armored vehicles should avoid railyards whenever possible, as tracks will quickly damage vehicles and the open yards themselves provide excellent defensive FofF. Rubble that may be present is normally easily bypassed.

4. Key Terrain.

Examples of urban key terrain include:

- Subway systems.
- Sewer systems.
- Underground water systems.
- Utility (gas and electric) generation, holding, and transmission facilities.
- Telephone exchanges.
- Radio and television stations.
- Rail and transit service connecting points.
- Stadiums, parks, sports fields, and school yards.
- Tall buildings (rooftops).

5. Avenues of Approach.

Avenues of approach are analyzed for battalion and smaller unit operations as the battalion is the most effective force of any size that can be employed under urban conditions. Avenues of approach are

dictated by the urban pattern and the actual mission. Urban avenues of approach will cover unusually narrow frontages and, when possible, multiple avenues will be employed to permit flanking and rear attacks in support of the main effort [Figure 1-7](#) shows typical avenue of approach widths for the five basic types of urban terrain.

AVENUES OF APPROACH	WIDTH IN METERS
Dense, Random Construction	150-200
Close-Orderly Block	200-300
Dispersed Residential Areas	300-400
High-Rise Areas	300-500
Industrial or Transportation Areas	400-600

Figure 1-7. Avenue of Approach widths.

URBAN MCOO DEVELOPMENT

1. If maps of the urban area are available, an MCOO is prepared. The MCOO shows construction patterns and depicts known obstacles and avenues of approach or mobility corridors. A MCOO can also be prepared using photographic maps of the city. If maps are not available, imagery of the build-up area should be annotated with the information. [Figures 1-8](#) and [1-9](#) show examples of urban MCOO development.

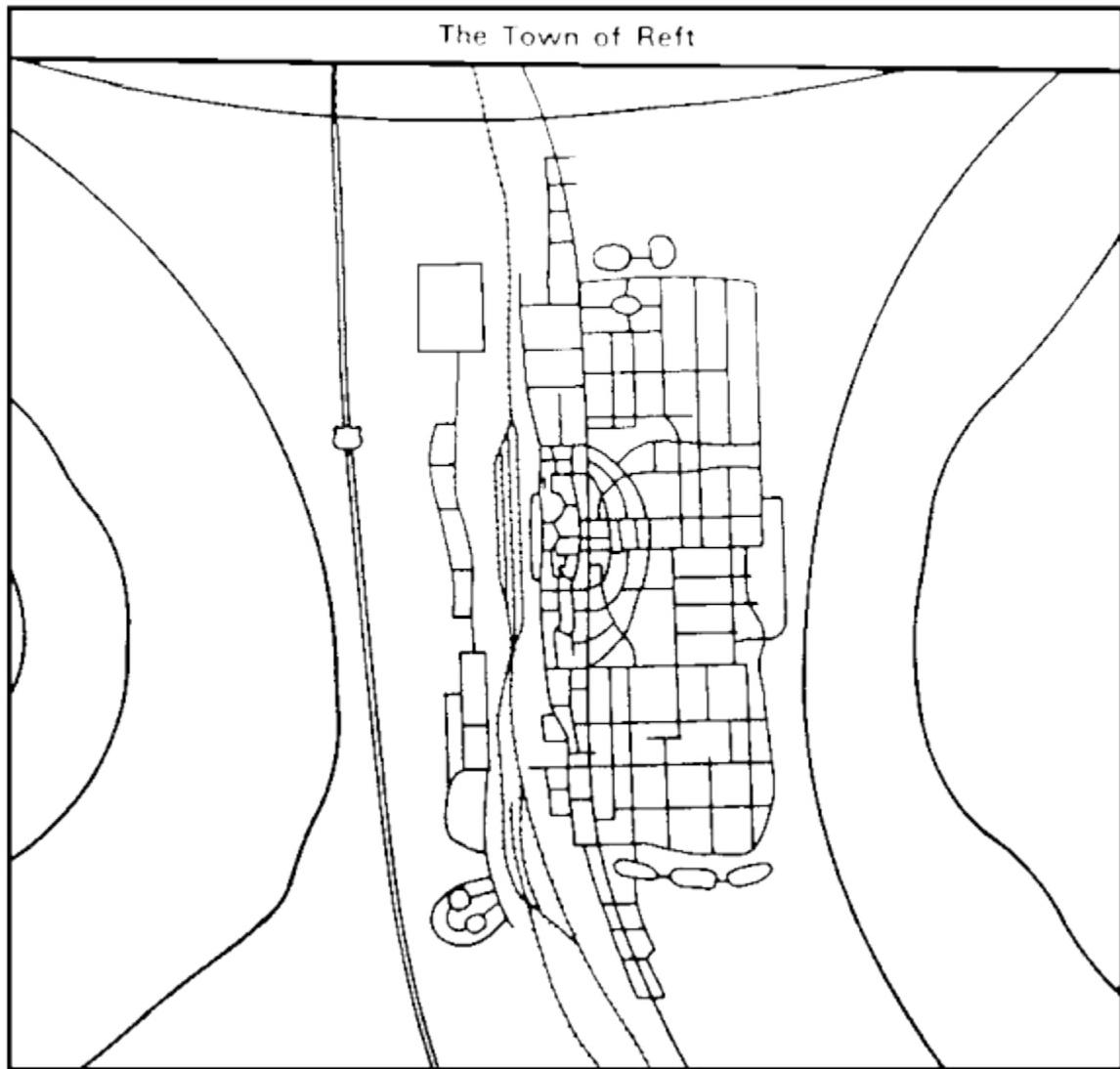


Figure 1-8. Example of an urban MCOO development.

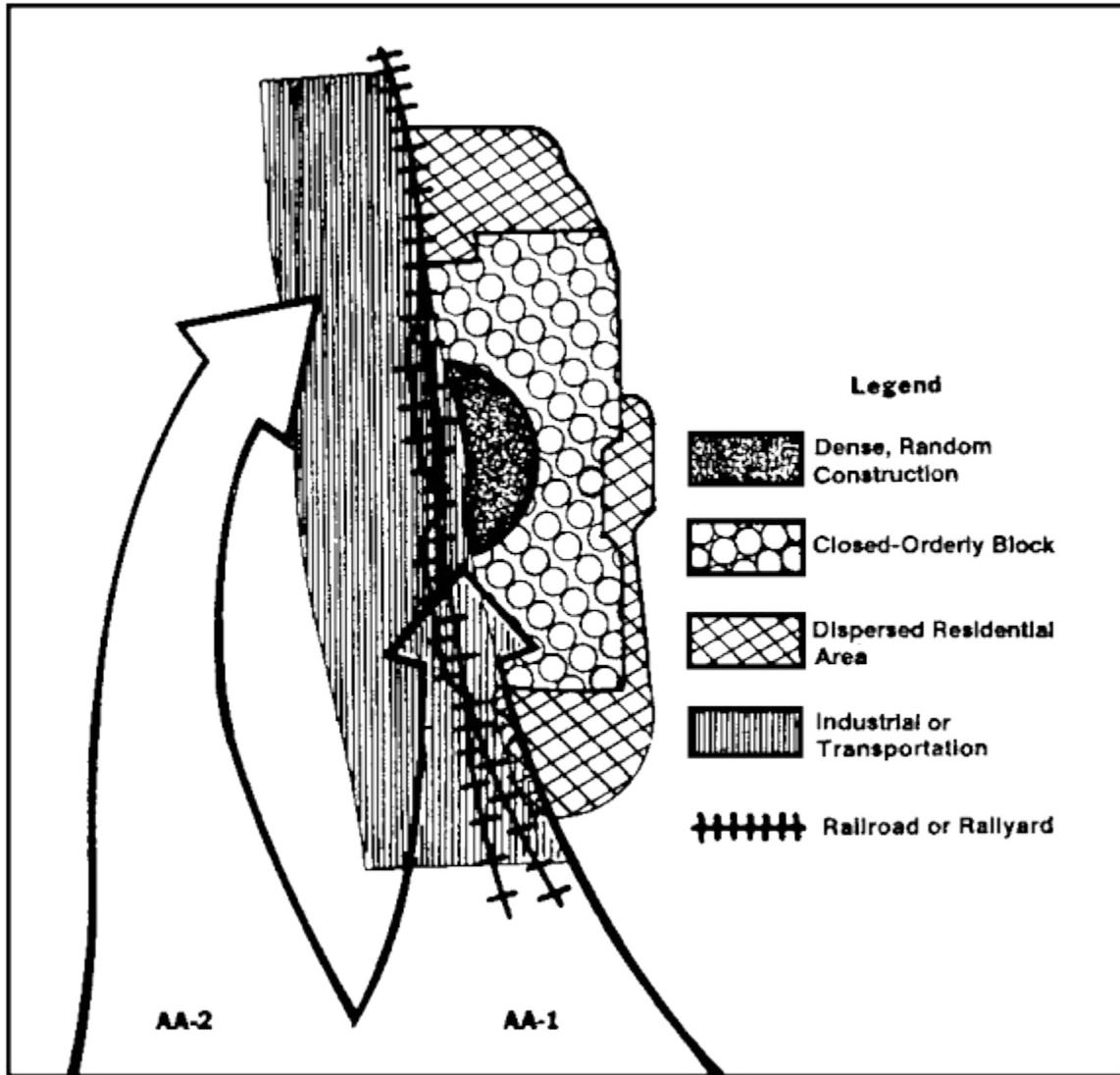


Figure 1-9. MCOO for the town Reft.

2. An avenue of approach or mobility corridor overlay for urban underground systems should be prepared when appropriate. This is required where the underground systems (sewer, water, subway, gas, steam, or telephone) have pipes, tunnels, or culverts large enough through which an individual can crawl. The overlay should show the size of the tunnels, pipes, and culverts and their approximate orientation. Color coding helps to distinguish systems of various types and sizes. When possible, subsurface avenues of approach or mobility corridors should be prioritized based on the likelihood of their use. [Figure 1-10](#) shows an example of an underground systems overlay.

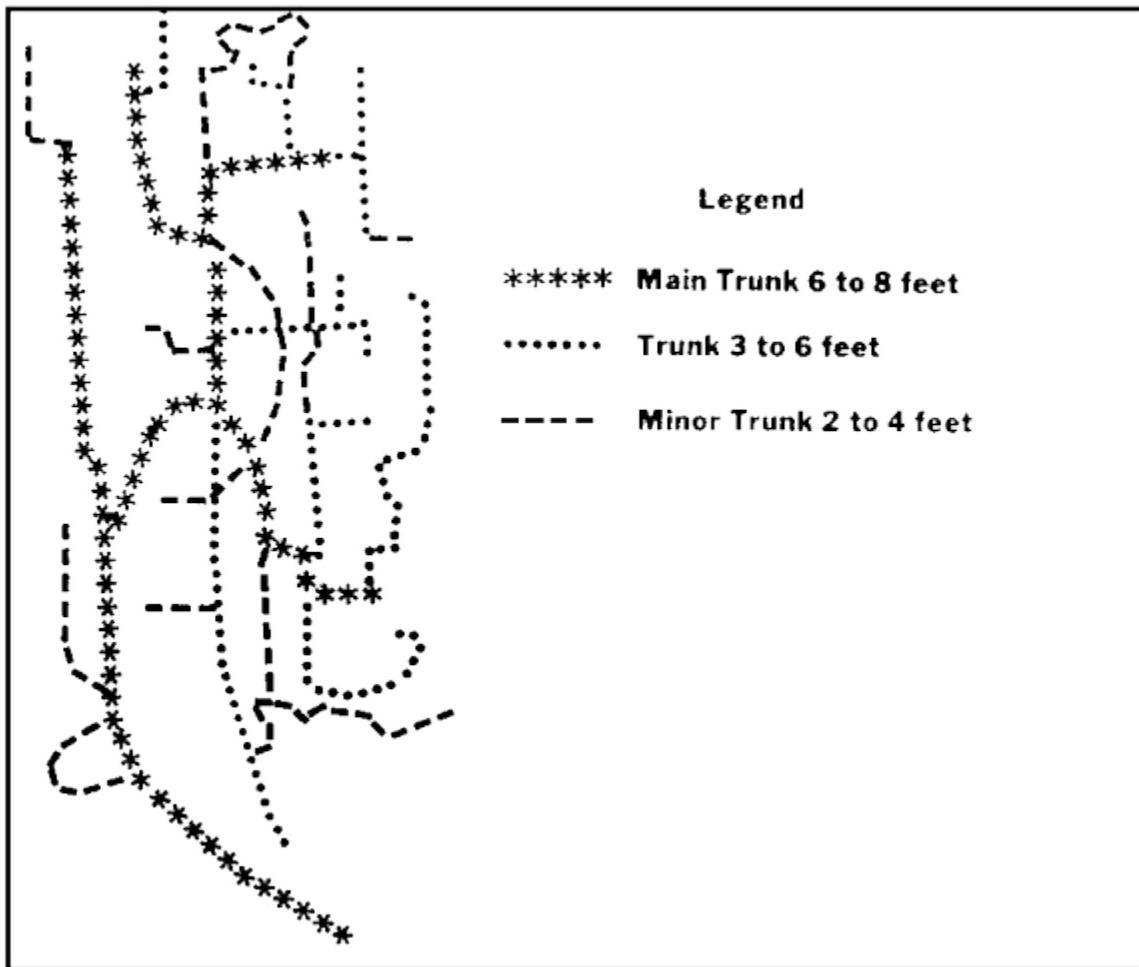


Figure 1-10. Example of an underground systems overlay for the town of Reft.

WEATHER ANALYSIS

1. Weather analysis for urban operations does not differ significantly from open terrain weather analysis. However, a few special considerations peculiar to the urban environment must be taken into account.
2. Rain or melting snow will often flood basements and subway systems. This is especially true when automatic pumping facilities that normally handle rising water levels are deprived of power. Rain will also make storm and other sewer systems hazardous or impassable. Chemical agents will be washed into underground systems by precipitation. These systems will, as a result, contain agent concentrations much higher than surface areas and will become contaminated hot spots. These effects will become more pronounced as agents are absorbed by brick or unsealed concrete sewer walls.
3. Many major cities are located along canals or rivers. This often creates a potential for fog in the low-lying areas. Industrial or transportation areas are often the most affected by fog due to their proximity to waterways.
4. Air inversion layers are common over cities, especially cities which are located in low-lying bowls or in river valleys. Inversion layers trap dust and other pollutants, reducing visibility, and often creating a greenhouse effect which causes a rise in ground and air temperatures.

5. The heating of buildings during the winter and the reflection and absorption of summer heat make built-up areas warmer than surrounding open areas during both summer and winter. This difference can be as great as 10 to 20 degrees, and can add to the already high logistics requirements of urban combat.

6. Windchill is not as pronounced in built-up areas. However, the configuration of streets, especially in closed-orderly block and high-rise areas, can cause wind canalization. This increases the effects of the wind on streets which parallel the wind direction, while cross-streets remain relatively well protected.

7. Light data has a special significance during urban operations. Night and periods of reduced visibility favor surprise, infiltration, detailed reconnaissance, attacks across open areas, the seizure of defended strongpoints, and the reduction of defended obstacles. However, the difficulties of night navigation in restrictive terrain, without reference points, and in close proximity to the enemy, forces reliance on extremely simple maneuver plans with easily recognizable objectives.

THREAT EVALUATION

1. Threat evaluation for urban combat uses the same three-step process: developing a threat data base, determining enemy capabilities and developing a doctrinal template file as threat evaluation for open terrain. However, the focus of the evaluation effort is largely directed toward battalion-sized and smaller operations, as units of this size are considered the most effective for urban operations.

2. The decision for threat forces to attack an urban area may be based on tactical, operational, or political considerations and is normally made at Army level or above. Threat forces may attack built-up areas to:

- a. Secure political, industrial, logistic, or communication facilities.
- b. Destroy defending forces within a built-up area.
- c. Gain passage through an urban area that cannot be by-passed.

3. While recognizing the requirement to defend built-up areas, threat forces always attempt to establish a defense well forward of an urban area in order to engage and defeat the attacker on the approaches and flanks of the built-up area. Threat forces revert to the conduct of defense within a built-up area only when:

- a. Attacking forces break through defenses organized forward.
- b. The built-up area has especially great political, strategic, or economic importance.
- c. It is necessary to defend a built-up area which is a sea-port, or other critical communications or transportation complex.

4. For both offensive and defensive operations, the Threat considers the motorized rifle battalion (MRB) the most effective unit for urban combat because of its inherent mobility, armor protection, and rapid ability to adapt buildings and other structures for defense. The battalion coordinates closely with units from other arms which attach elements or provide support or security. The battalion will be reinforced by other elements depending upon the mission and the expected conditions in the urban area.

5. During the attack, the MRB is reinforced with a tank company, a battalion of self-propelled artillery for direct fire, an engineer company, and a chemical reconnaissance section. An additional artillery battalion will be placed in direct support to provide indirect fire. Missions normally assigned to an MRB as the first echelon of a main attack are to:

- a. Seize immediate objectives on the edge of the city.
- b. Attack along primary routes to secure deep objectives and key facilities.
- c. [Figure 1-11](#) shows a doctrinal template for an MRB as the first echelon of a main attack. The battalion assaults in column.

6. Second-echelon MRBs are also reinforced with tanks, artillery, and engineers. This provides for rapid replacement of the first echelon without having to reassign units during combat. Missions normally assigned second-echelon MRBs are to:

- a. Reinforce the first echelon.
- b. Be prepared to assume the first echelon mission.
- c. Provide replacements for combat ineffective first-echelon units.
- d. Reduce bypassed enemy defensive positions.

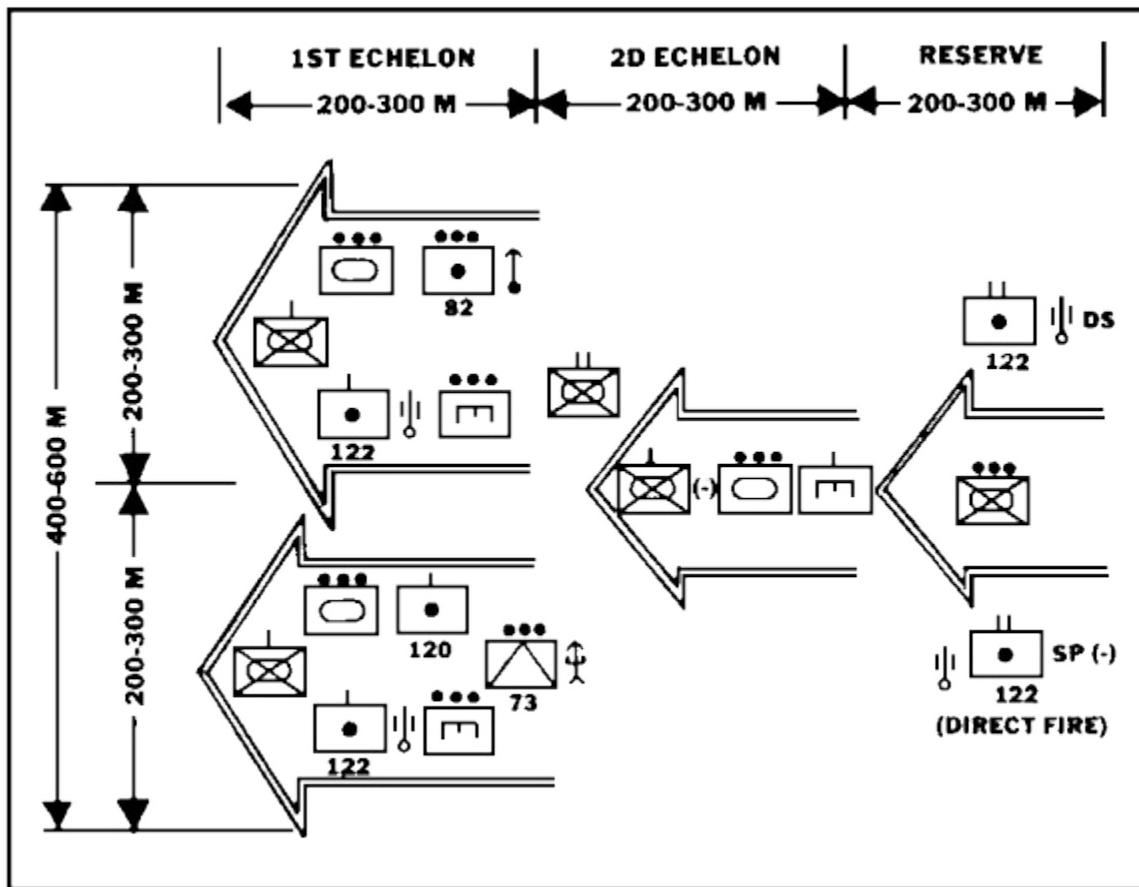


Figure 1-11. Example of an attack of built-up area by reinforced MRB (main attack).

7. Reserve MRBs are prepared to:

- a. Pass through either echelon to exploit defensive weaknesses.
 - b. Protect the flanks.
 - c. Conduct firefighting and debris clearing missions as required.
8. Motorized rifle companies (MRC) may be designated as assault groups. Companies conducting the main attack are reinforced with a tank platoon, an artillery battery, chemical, and flame thrower units, and an engineer platoon. Frequently, battalion antitank assets will also be attached to the company making the main attack.
9. Attached elements are further attached to platoons, providing each platoon with at least one tank or artillery weapon and some engineer support. These attachments allow decentralized or independent operations by individual platoons in seizing specific objectives. [Figure 1-12](#) shows the doctrinal configuration for a motorized rifle platoon (MRP) assault on an urban strongpoint.

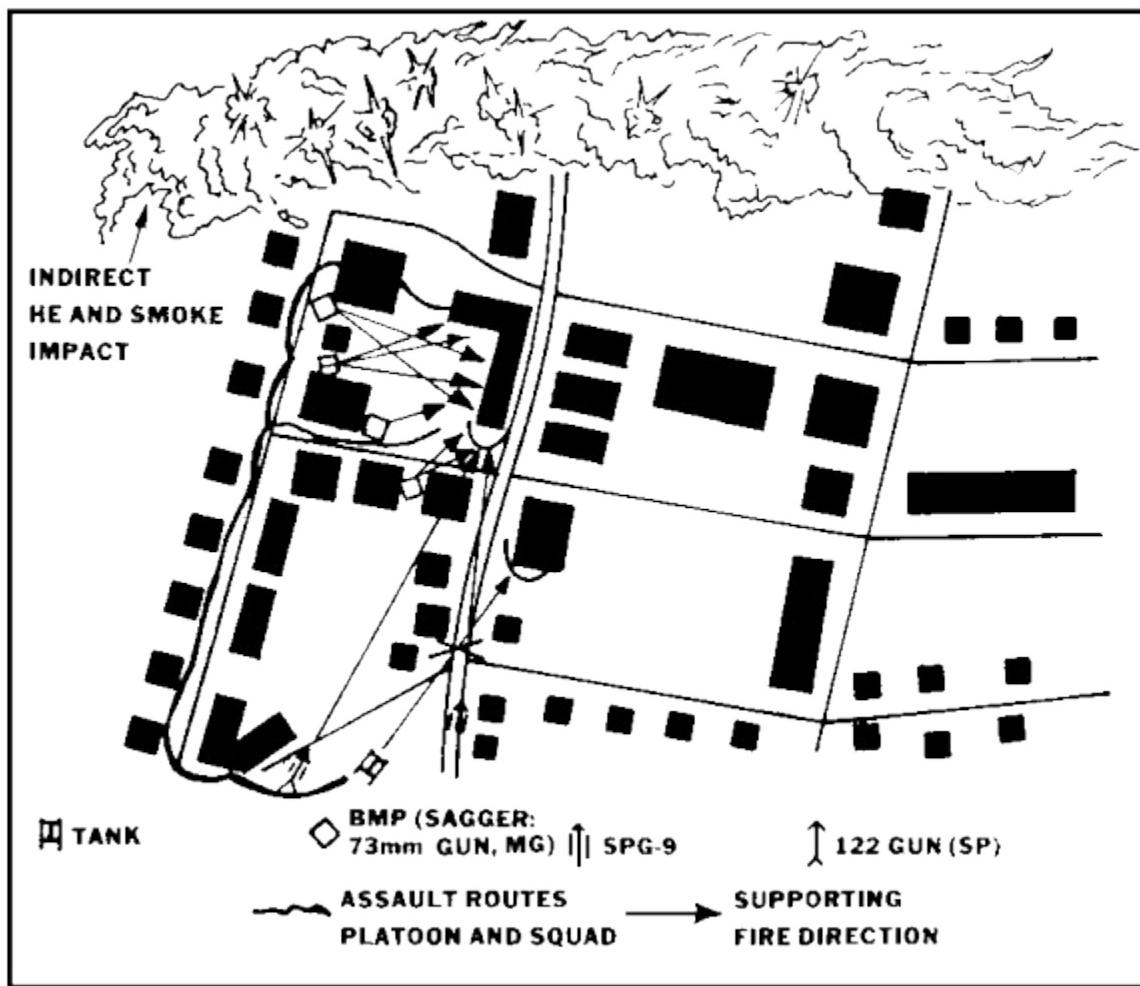


Figure 1-12. Example of an MRP assault on an urban strongpoint.

10. Night operations are stressed to maintain uninterrupted momentum and to reduce casualties during the urban battle. Night operations against built-up areas are conducted to:
- a. Bypass outlying villages being used as defensive positions.

- b. Seize initial objectives on the edge of the built-up area when required to attack across open ground.
 - c. Attack across broad streets, parks, or between buildings.
 - d. Seize heavily defended strongpoints.
 - c. Reduce street obstacles that are well covered by fires and protected by mines.
 - d. Exploit daylight successes by keeping pressure on the defense.
11. Reconnaissance units will attempt to infiltrate night objectives to obtain information and to guide assault forces to the objectives. Assault groups normally attack in a single echelon with units deployed on line. Supporting fires are withheld until the assault is detected. Once the attack has been detected, artillery illuminates the objective, and attached tanks and artillery suppress defenses with direct fires.
12. When surprise cannot be achieved, night assaults may be preceded by direct tank and artillery fires. Artillery and mortars seal off the objective to prevent withdrawal or reinforcement. Illumination is used to guide forces, illuminate the objectives, and dazzle night vision devices.
13. Threat evaluation is similar to that for OOTW during urban counterinsurgency (COIN), counterguerrilla, and counterterrorist operations.
14. Population status overlays are prepared for the city showing potential neighborhoods or districts where a hostile population may be encountered. Overlays are also prepared showing insurgent or terrorist safe houses, headquarters, known operating areas, contact points, and weapons supply sources. These overlays must include buildings which are known or have the potential to be explosives, ammunition, or weapons storage sites.
15. Underground routes are of primary concern when considering insurgent and terrorist avenues of approach and LOCs. Sewers, subways, tunnels, cisterns, and basements provide mobility, concealment, cover, and storage sites for insurgents and terrorists. Elevated railways, pedestrian overpasses, rooftops, fire escapes, balconies, and access ladders provide mobility and concealment and can serve as relatively good fighting and sniping positions.
16. Although doctrinal templates are not developed for urban insurgency and terrorist operations, pattern analysis will reveal how the insurgent or terrorist group operates, and what are its primary targets. Once the group's modus operandi (MO) has been determined, insurgent situation maps (SITMAPs) that pinpoint likely sabotage, kidnap or assassination targets, ambush points, and bombing targets can be developed. When developing these SITMAPs, the following should be considered as primary insurgent and terrorist targets:

- a. Electric power generation and transmission facilities.
- b. Gas production and holding facilities.
- c. Water and sewer pumping and treatment plants.
- d. Telephone exchanges and facilities.
- e. Radio and television stations.

THREAT INTEGRATION

1. Threat integration for the urban battle is accomplished through the development of situation, event, and decision support templates during mid- and high-intensity conflict situations. During OOTW and terrorist situations, the decision support template (DST) normally is not developed. A decision support matrix which equates insurgent or terrorist capabilities with potential activities may be prepared. However, it cannot be stressed too heavily that indicators of insurgent or terrorist activity do not necessarily equate to actual insurgent or terrorist operations. It is possible to prepare an insurgent or terrorist decision support matrix which has multiple indicators of activity and to have no actual activity. It is also possible, and quite normal, to have no indicators of activity prior to an operation or for the visible indicators to point to the wrong area or target.
2. For conventional operations, situation templates, like doctrinal templates, focus on the MRB as the primary urban combat force. However, situation templates for operations down to platoon size may have to be developed. The actual echelon of the force depicted on the situation template will depend on the actual operation and the mission of the friendly unit.
3. During offensive operations, the MRB attacks in a series of bold, rapid movements along at least one primary route and one secondary route to secure assigned objectives. Buildings are not searched or secured unless resistance is strong. Bypassed defenders are left to following echelons. If the first echelon is stopped or slowed, the following echelon or reserves may be committed around engaged forces, and continue to the objective. [Figures 1-13](#) and [1-14](#) provide examples of situation templates for attack along a primary and secondary route and for bypass operations.
4. Situation templating for insurgent or terrorist operations must consider that groups will often conduct multiple operations simultaneously within a given area. Some of these operations may be diversionary, designed to detract attention away from the primary objective. More often, they are designed to force authorities to deal with several incidents at once, thus creating the illusion that they are unable to cope with the situation.

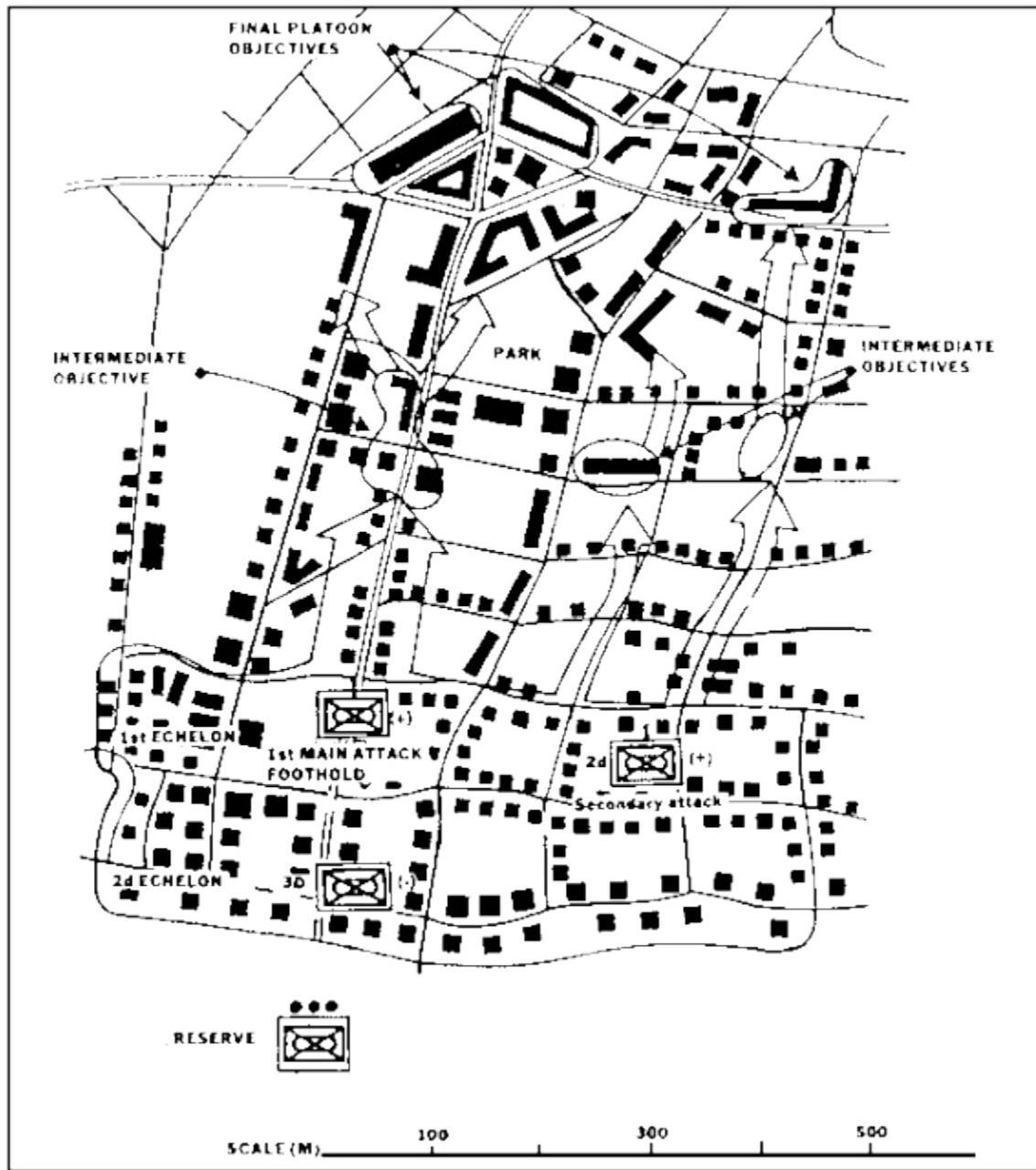


Figure 1-13. Example of an MRB attack in a built-up area.

5. Event templating for urban operations must be keyed to terrain, as keying named areas of interest (NAIs) to actual events has limited utility in a slow-moving urban battle.

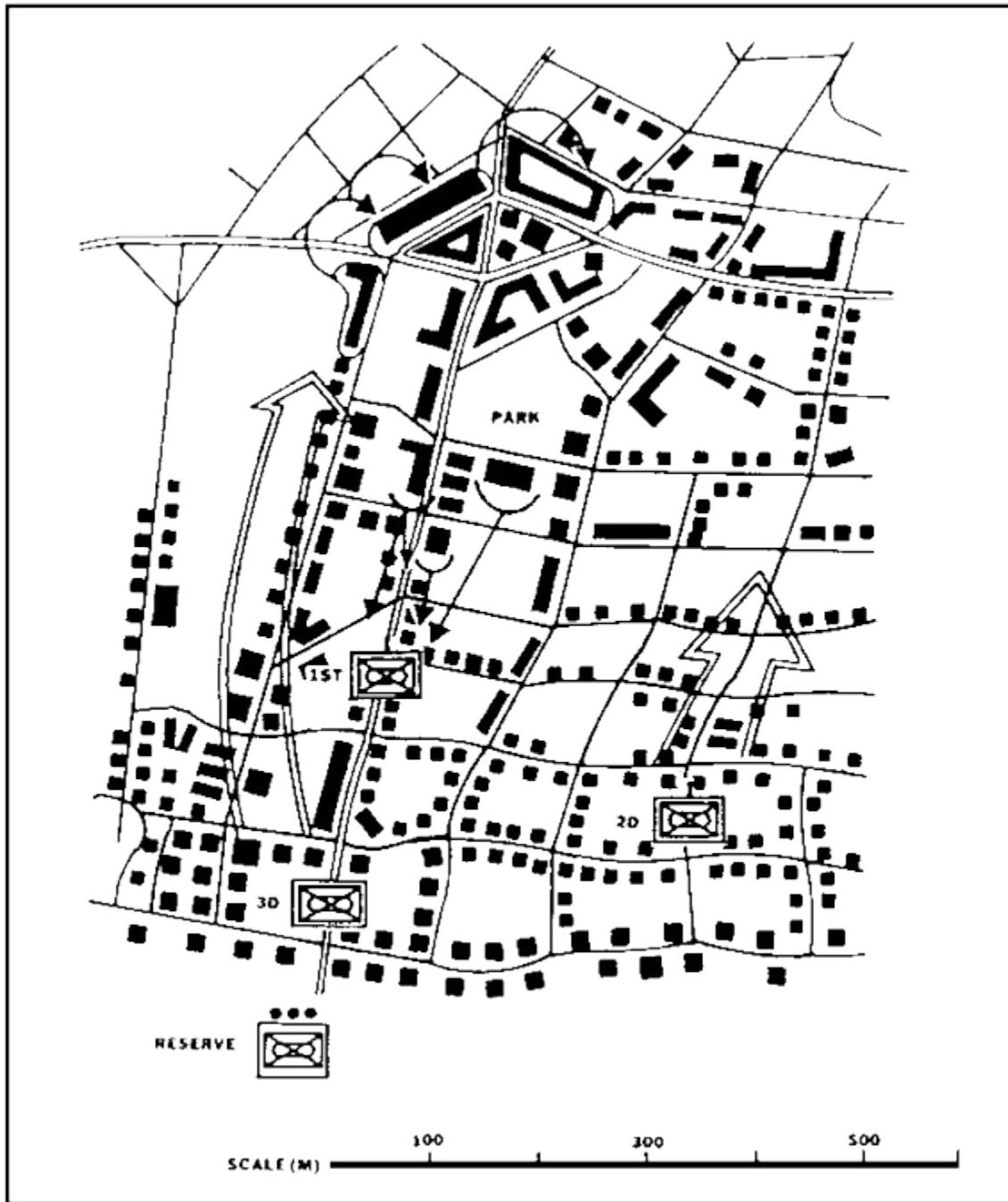


Figure 1-14. Example of a 2d echelon committed around engaged 1st echelon.

6. During enemy offensive operations, event templating must focus on the enemy's attack routes, where and when the second echelon will probably be committed, and how the second echelon will attempt to bypass stalled first-echelon elements. Because NAIs may be individual buildings, they may be closer together than in normal open-country operations. However, they perform the same functions of confirming or denying an enemy course of action and serving as the basis for directing the collection effort. Troops in contact, scouts, patrols, agents, line-crossers, and interrogators are often the most effective collection assets in the urban battle, although timeliness becomes a factor. Together with aircraft, these assets are a primary consideration when developing NAIs for urban operations. [Figure 1-15](#) is an example of an urban battle event template for an enemy attack.

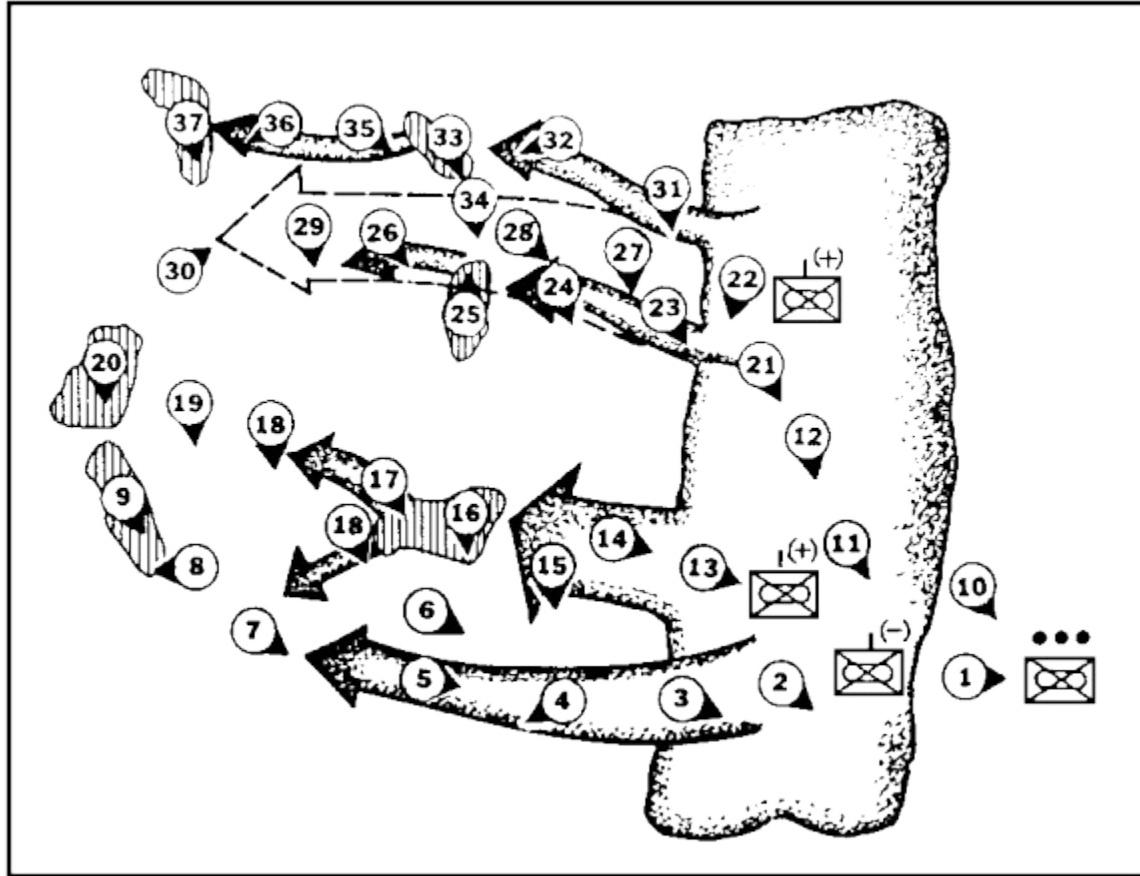


Figure 1-15. Example of an urban battle event template.

7. DSTs for urban operations must be the direct result of war-gaming. As with situation and event templates, the DST will normally deal with an area less than 1,000 meters square. As it normally covers a relatively small area and deals with exceptionally slow-paced operations, the DSTs will only rarely rely on time-phase line (TPLs) to key decisions. However, cross streets which run perpendicular to the axis of advance may take the place of TPLs. Street intersections, open areas, or individual buildings may also serve as DPs, especially when street patterns are not rectangular. DPs must consider the slower pace of urban operations, and not be places too far in advance or too close to the TAI to which they are keyed.

8. It is exceptionally critical to prepare an enemy DST for urban operations. The restrictive nature of the terrain limits freedom of action to such an extent that the commander must be able to determine enemy options at a glance. When possible, the enemy DST should be developed on, or as an overlay to the friendly DST. It is also possible to develop a combined friendly and enemy DST and operating factors matrix with decisions or counter-decisions keyed to points, events, or TPLs. As night operations are heavily stressed to achieve surprise in urban warfare, the analyst may consider developing separate DSTs for day and night operations. Factors to consider when developing night DSTs are:

- Infiltration.
- Increased reconnaissance.
- A generally more rapid pace of operations.

- d. A reliance on stealth and illumination.
9. [Figure 1-16](#) shows an example of a friendly DST. [Figure 1-17](#) shows an example of an enemy DST.

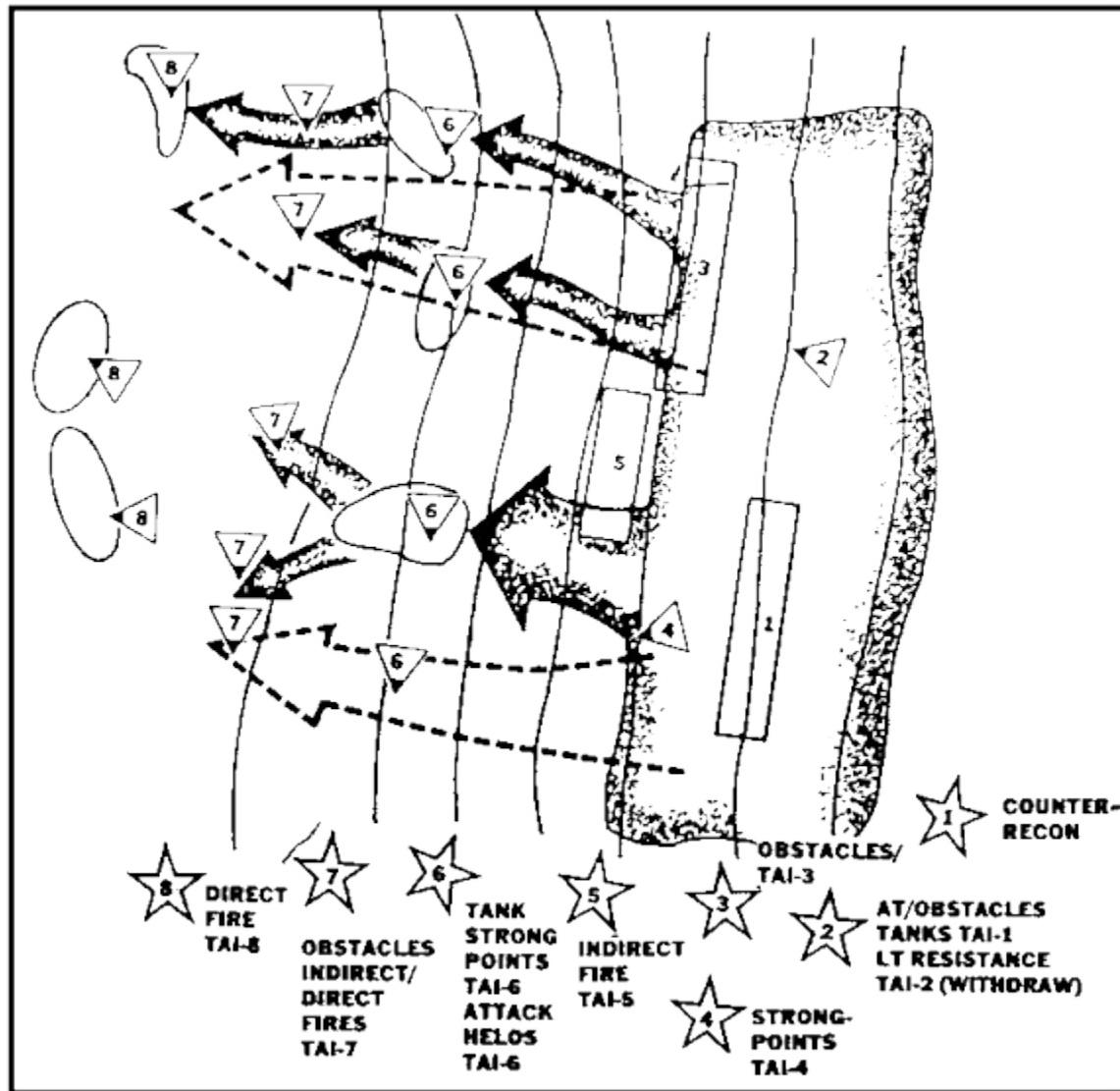


Figure 1-16. Example of a friendly DST (enemy attack).

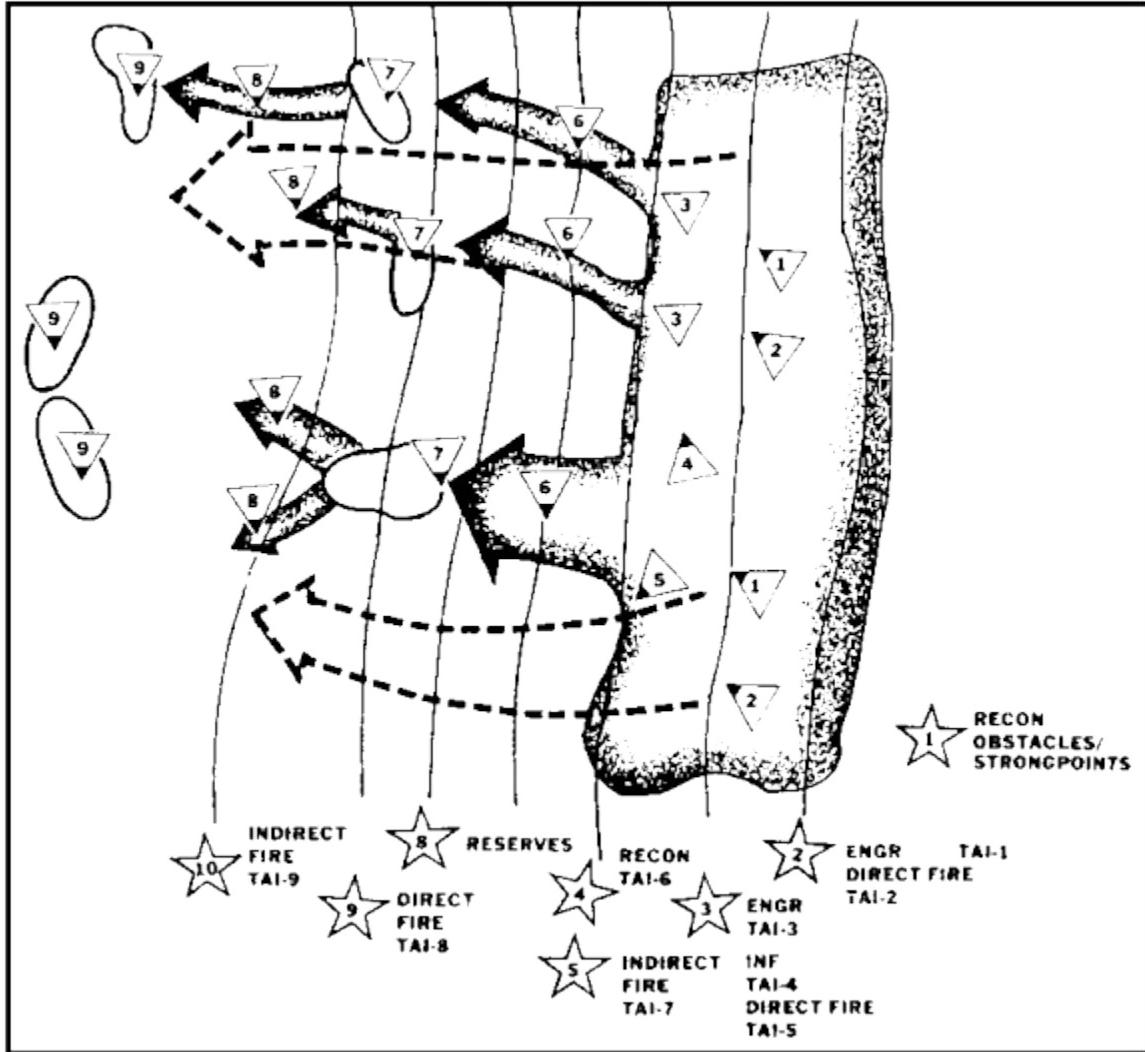


Figure 1-17. Example of an enemy DST.

Lesson 1

Practice Exercise

Instructions The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

1. The requirements for combat in built-up areas create a
 - A. never ending void that will require forward elements to stop or suspend the attack.
 - B. need to reevaluate the mission of the attacking force.
 - C. need to train the force in dealing with terrorist and urban insurgents.
 - D. variety of troop control, maneuver, and equipment utilization problems.
2. Combat in urban terrain is expected to break down into a number of small-unit battles fought by battalions, companies, platoons, and squads or small assault groups in confined areas. These conditions create:
 - A. A greater demand for ammunition and rations, thus imposing unusual strains on logistics.
 - B. An ideal situation for small-unit leaders to use their initiative in controlling the battle.
 - C. The need for the use of weapons of mass destruction.
 - D. The immediate employment of the battalion engineer assets to establish breaching points.
3. Battlefield area evaluation for the urban battle involves the analysis of the urban area and a definition of the actual area to be considered. Of the choices listed below, which is not a consideration?
 - A. Is the Area of Operation (AO) a typical European town with narrow streets, circular configuration, and low-terrain location?
 - B. Is the mission combat or reconnaissance?
 - C. Is the threat a conventional force, an urban insurgency, a terrorist group, or a guerilla war that has spread to the urban area?
 - D. What are the political considerations of the operation?

4. Since military maps do not provide sufficient detail (too small a scale and are normally too outdated to be useful for purposes more detailed than general urban pattern analysis), what should be constructed for use in conjunction with or in lieu of city maps?
 - A. Plans published by the city.
 - B. Plans published by the state.
 - C. Photomosaics.
 - D. Overlays.
5. The layout of an urban area will normally follow a definite pattern which is easily identified by terrain analysts. What do the analysts recognize?
 - A. Two basic patterns and one basic subpattern.
 - B. Two basic patterns and two basic subpatterns.
 - C. Three basic patterns and two basic subpatterns.
 - D. Three basic patterns and three basic subpatterns.
6. The restrictive nature of urban terrain forces the analyst to be concerned with minimum rather than maximum
 - A. Load capacity for each soldier.
 - B. Use of force.
 - C. Use of radio communications.
 - D. Weapons ranges.
7. What kind of unit does the threat consider to be the most effective unit for urban combat for either offensive and defensive operations?
 - A. A motorized rifle battalion.
 - B. A motorized rifle company.
 - C. A motorized rifle platoon.
 - D. An airborne special operations unit.
8. A decision support template (DST) for urban operations must be the direct result of wargaming. How much area will the DST normally deal with?
 - A. 500 meters square.
 - B. Less than 1,000 meters square.
 - C. 1,500 meters square.
 - D. Less than 2,000 meters square.

Practice Exercise

Answer Key and Feedback

1. The requirements for combat in built-up areas create a
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LESSON 2

MILITARY OPERATIONS ON URBAN TERRAIN (DEFENSE)

OVERVIEW

LESSON DESCRIPTION:

In this lesson you will learn to perform a specific task required in planning for and conducting a defensive operation on urbanized terrain.

TERMINAL LEARNING OBJECTIVE:

ACTION: Explain Threat doctrine for conducting an attack on urban terrain.

CONDITION: Given extracts of doctrinal literature, a tactical situation for a battalion TF S3, and a series of multiple-choice questions relating to Threat force offensive doctrine.

STANDARD: To demonstrate competency of the task, you must achieve a minimum of 70% on the subcourse examination.

REFERENCES: The material contained in this lesson was derived from the following publications: [FM 34-130](#), [FM 90-10-1](#), and FM 100-2-2.

COMBAT IN CITIES

1. Although their doctrine stresses speed and dynamic maneuver, the former Soviets fully realize that movement through urban areas may result in greater ammunition expenditures and casualties and slower rates of advance. The former Soviets have long acknowledged that combat in cities will be unavoidable at times. Given urbanization trends in Western Europe, combat in cities could be more the rule than the exception in that area.

2. The former Soviet ground forces consider combat in cities to consist of only those missions conducted in heavily populated cities and towns. Combat in isolated villages or groups of buildings along roads in agricultural or open areas are considered actions in or against strongpoints and are outside the scope of this lesson.

3. The former Soviets classify towns and cities according to shape, population, and perimeter. The former Soviets calculate that in Europe there are one or two small cities for every 200 to 300 square kilometers of terrain. In a European conflict, there is potential for involvement in combat in cities on the average of every 40 to 60 kilometers.

4. The decision to attack a city or town may be politically, strategically, or tactically motivated and normally is made at army level or above. Tactical reasons for attack may include:

- a. The city or town is key terrain.

- b. The area encompasses vital communications crossings.
 - c. It is necessary to protect an exposed flank.
 - d. It serves as a diversionary operation.
 - e. It would tie down enemy troops and reserves.
 - f. The built-up area is unavoidable due to the extent of urbanization.
5. In the offense, the former Soviets plan for their lead echelons to cut off and to destroy enemy forces before they can occupy cities. If this is not possible, the former Soviets plan to bypass pockets of resistance with leading echelons and continue the advance. Bypassed enemy-held areas are sealed off and may be neutralized by the following echelons.

DOCTRINE

1. Former Soviet principles for offensive combat in cities at division level are:
 - a. Conduct initial attacks from the march, after reconnaissance.
 - b. Launch attacks from positions in contact with the enemy if initial operations fail to make progress.
 - c. Decentralize command and control to the maximum possible extent.
 - d. Maintain continuous pressure on the enemy through day and night combat.
 - e. Conceal movement through the use of smoke, darkness, or low visibility.
 - f. Integrate company-sized tank, motorized rifle, and combat engineer assault groups with the direct support of anti-tank guns and the direct and indirect support of artillery and mortars.
2. While combined arms assault groups provide the main effort during combat in cities, heliborne assaults on key points may be used. Helicopters may lift motorized rifle troops to key points in the battle area. During combat in cities, a former Soviet division normally attacks in two echelons at each level of command with the following frontages:
 - a. Division 4 to 6 kilometers.
 - b. Regiment 2 to 3 kilometers.
 - c. Battalion 400 to 600 meters.
 - d. Company 200 to 300 meters.
3. Main axes are along major roads to capture key areas, to disrupt the defense, and to cross the area in the shortest possible time. Division and regimental axes are major roads. A battalion might advance on two or three parallel streets, with one company axis per street.
4. Combat on such restricted frontages and axes of advance, results in the following significant control problems:
 - a. Difficulty in coordinating attacks progressing at different rates with fire support.

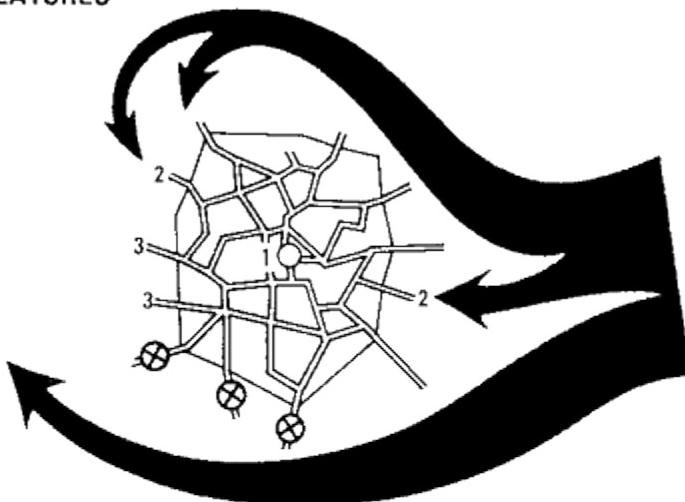
- b. Communications problems caused by a large number of VHF radios operating in close proximity and being screened by buildings.
 - c. Identification of targets and coordination of fire against targets in depth.
 - d. Logistic problems, particularly the resupply of ammunition, which may be used at an extremely high rate in intense combat.
5. The commander determines force size and composition based on the area's size, shape, building type, and street patterns as well as the strength of defending forces. Attacking forces are not evenly distributed around the built-up area. They are employed over the most favorable avenues of approach. Because of the manpower-intensive, close-combat nature of combat in cities, motorized rifle rather than tank units are preferred. Normally, regiments coordinate the attacks and battalions conduct them. Division and regimental resources reinforce the battalions as required. Individual battalions may have a variety of missions, depending on the situation. Reserves are created at regimental rather than division level.

REPRESENTATIVE TACTICAL FEATURES OF CITY ATTACK

(Main Force bypasses. Second echelon forces execute frontal holding attack and attack from rear.)

LEGEND:

1. Forward detachment operating in advance to seize critical bridges, junctions, or installations.
 2. "Reconnaissance by battle." Probing attacks to determine defensive positions.
 3. Withdrawal routes blocked by tank elements or airlanded forces.
- Mobile obstacle detachments block withdrawal routes and protect main force flanks.



SOVIET ANALYSIS OF THE LAYOUT OF CITIES

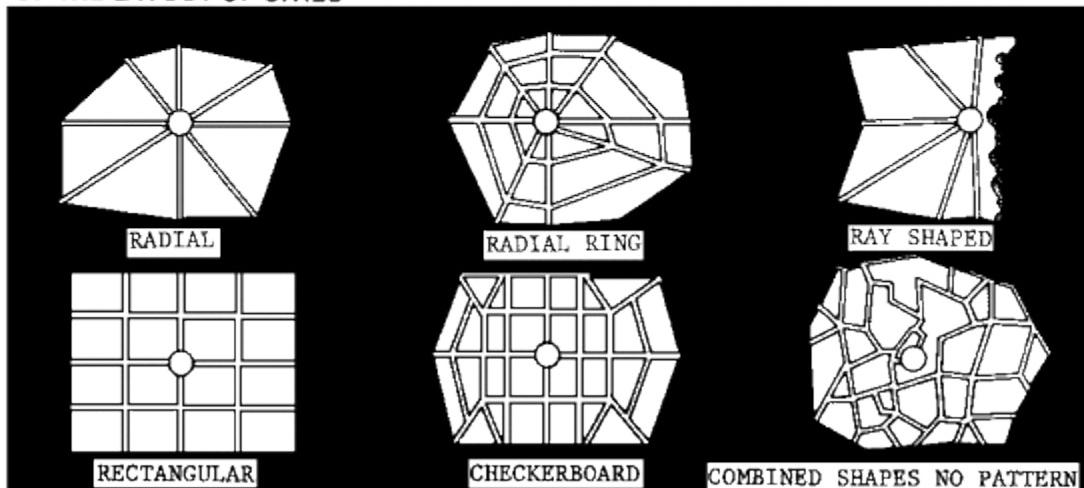


Figure 2-1. Tactics and Analysis.

6. Motorized rifle battalions may be employed in either the first or second echelons of an assault on a city or town. In either case, their organization, tasks, and assault tactics are probably the same. [Figure 2-1](#) shows the representative tactical features of city attack.

7. In combat in cities, the former Soviets call their assault battalions "assault detachments." They are organized into two echelons. Each company is formed into an "assault group." A typical combat organization for an assault group is:

- a. A motorized rifle company.
- b. One or two tank platoons.
- c. Antitank guns.
- d. An artillery battery, in the direct fire role.

- e. A combat engineer platoon.
 - f. Flamethrower and chemical specialists.
8. Besides the fire support on hand at company level, the battalion commander normally has artillery and mortar units under his control to give indirect fire support to his assault groups. Indirect fire weapons are employed to destroy enemy strongpoints and to neutralize enemy reserves.
9. Assault groups are task organized and may include:
- a. Attack or seizure groups consisting of a motorized rifle platoon reinforced by tanks.
 - b. A covering and holding group consisting of up to a motorized rifle platoon reinforced by antitank guns.
 - c. A fire support group which includes attached artillery in the direct fire role and flame-throwers.
 - d. A group of combat engineers equipped with bangalore torpedoes and mine-clearing devices.
10. One or two motorized rifle squads may be used as a reserve force to either strengthen attacking or holding groups or to carry out a contingency task. Tank units are used to:
- a. Serve, with combined arms reinforcement, as an advance guard in the approach to the city.
 - b. Cut off or envelop the enemy before he reaches the built-up area.
 - c. Envelop the city.
 - d. Reinforce infantry in street fighting.
 - e. Serve as a mobile reserve.
11. Artillery is decentralized during offensive combat in cities. The commander may attach up to 50 percent of available artillery to assault groups to be used in the direct fire role. The remainder is organized into an artillery group to provide on-call indirect and counterbattery fire. Howitzers and mortars are used for counterbattery tasks. Preparatory fires are shorter than normal, 5 to 20 minutes being the historical precedent.
12. The missions of engineer subunits accompanying assault groups are engineer reconnaissance, destruction of buildings, mine clearance, and clearing routes of rubble to allow movement of tanks, APCs, and artillery.
13. Antiaircraft weapons, both handheld and crew served, are used to cover artillery firing positions and commander's observation posts against low-flying aircraft and helicopters. When not engaged in this primary role, they suppress enemy ground fire.
14. Unlike combat in more open terrain, the former Soviet doctrine stresses decentralized control in combat in cities. This puts a heavy burden on the battalion's communication systems. However, only through decentralization can they cope with the tactical problems of controlling troops fighting in close quarters.

15. It is unlikely that nuclear weapons would be used within a city. Extensive destruction and contamination would only hinder offensive progress. **They may however, use non-persistent chemical weapons because of their potential for human destruction without causing material damage.**

16. The former Soviets can be expected to use psychological warfare, including threats, promises, misinformation, and rumors. These would be directed against both military defenders and the civilian population.

THE OFFENSE

1. Combat in the cities imposes demands for a slower pace and tempo of attacks; longer duration of commitment; shorter, intense preparatory fires; and specially tailored forces. The former Soviet tactics reflect these concepts.

2. Initial reconnaissance of a target urban area is made following study of large-scale maps, aerial photographs and background intelligence reports. Tactical intelligence will update such background data from long-range reconnaissance patrols, agent reports, aerial reconnaissance, and signal intelligence. When required, task-organized reconnaissance groups drawn from motorized rifle and tank units reinforce divisional and regimental reconnaissance.

3. The specific mission of reconnaissance units and groups from division and regiment is to identify:

- a. Enemy deployments outside the built-up area.
- b. Strongpoints within the city.
- c. Command posts and communications centers.
- d. Reserves.
- e. Enemy withdrawal routes and successive defensive positions.

4. On receiving his orders from the regimental commander, a battalion commander clarifies his mission by studying his superior's concept of attack. He immediately gives his subordinates a warning order containing the battalion's mission, with his guidelines for its completion. The battalion commander then makes his estimate of the situation. He assesses the enemy, the need for reconnaissance missions, the battalion's combat organizations, tasks for his own troops, and terrain. Using large-scale maps and aerial photographs, the battalion commander studies the objective area and assigns tasks to individual assault groups.

5. If time and situation allow, the battalion commander conducts a terrain reconnaissance of his objective, from a suitable vantage point. The assault group commanders accompany him, and they coordinate on-the-ground reference points and targets for supporting weapons. During this reconnaissance, the commander selects and defines departure lines and unit boundaries.

6. The battalion commander and his staff prepare the attack order, which includes:

- a. Objectives to be seized.

- b. Approach routes, lines of departure, and phases (lines) for assault.
 - c. Method of assault of individual buildings and blocks.
 - d. Actions of flanking units.
 - e. Method of destroying bypassed groups of enemy.
 - f. Details of fire and movement.
 - g. Details of smoke, chemical, and flame-thrower use.
 - h. Locations of command posts and control points and the procedure for moving them forward during the attack.
7. Control of battalion offensive tactics in cities differs significantly from combat in open terrain. Company-size assault groups attack concurrently and independently. A major reason for decentralization is the greatly restricted area of observation and radio transmission range. The former Soviets pay particular attention to the difficulties of coordinating indirect artillery fire.
8. The battalion command observation post is located 200 to 300 meters behind the assault groups. The battalion commander personally assigns indirect fire missions to the artillery commander, who is collocated with him. The former Soviets believe that the battalion commander, by staying as far forward as possible, can personally influence the conduct of an attack.
9. Preparatory indirect artillery fire against urban targets is intensive but short, normally lasting only 5 to 20 minutes. Tactical aircraft attack enemy reserve positions, artillery emplacements, and communications centers. As assault units reach a safety line, artillery fire is shifted to the enemy rear. Smoke is used to conceal approach routes.
10. Canals and rivers that flow through cities pose significant obstacles to the attacker. Accordingly, reconnaissance elements identify likely crossing areas and standing bridges which are designated as priority objectives. Assault crossing parties with tank-launched bridges may be positioned well forward in attack units.
11. After destroying strongpoints at the edge of the city, assault groups move forward on major roads toward the center of the city. Smoke may be used to cover flanks or conceal forward movement. Infantrymen carry up to twice the normal allocation of ammunition to compensate for high intensity of fire. If resistance is light, the former Soviets may move infantry forward by mounting them either in APCs or on tanks. Most common, however, is for infantry subunits to move on foot along streets, clearing buildings one by one. Where necessary, they clear houses by simultaneous assaults from roof and ground floor. They also use automatic weapons and grenades extensively. Combat engineers attached to assault groups make entry and exit holes through masonry walls. They make maximum use of underground passages. Specially assigned teams follow up assault groups to destroy small enemy parties that survive the initial assaults. [Figure 2-2](#) shows a reinforced MRB attack through a city.

Reinforced Motorized Rifle Battalion Attack Through a City

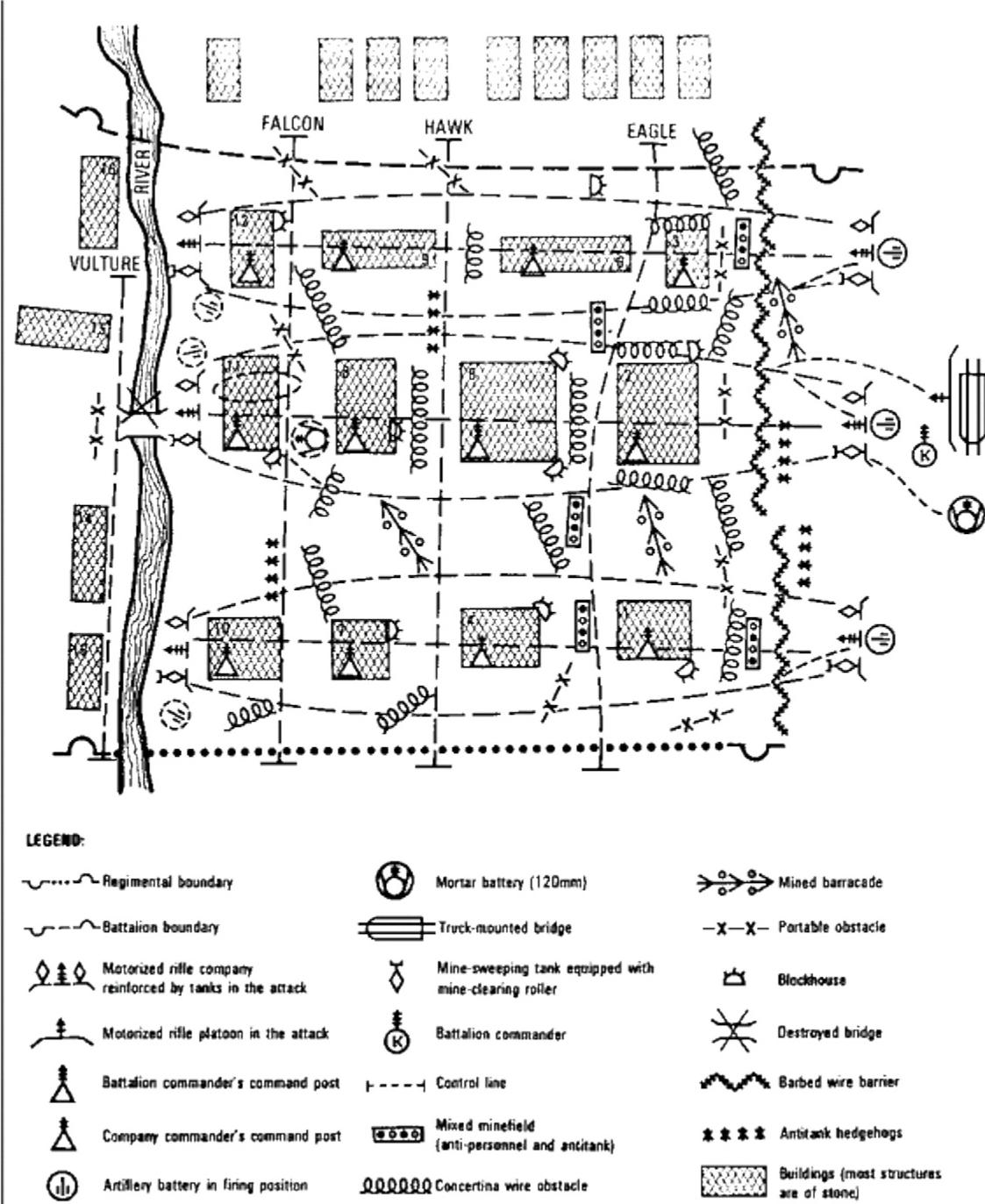


Figure 2-2. Reinforced MRB attack through a city.

12. Tanks are used to support infantry and to neutralize enemy strongpoints. Former Soviet doctrine calls for strong reserves of tanks at both battalion and regimental levels.

13. Tactics for fighting at night remain basically the same as those used by day. The former Soviets try to maintain the same attack intensity at night. Illumination is used both as an aid to their troops as well as a means to blind the enemy.

14. The battalion second echelon is used to exploit the success of first-echelon assault groups. Normally, the regimental commander gives the order to commit the battalion second echelon to the assault. It may leapfrog through first-echelon subunits already in contact with the enemy. Occasionally, the second echelon must complete the task of first-echelon subunits.

Lesson 2

Practice Exercise

Instructions The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

1. How many square kilometers of terrain does the former Soviets calculate they will encounter one or two small cities in Europe?
 - A. 50 to 100 square kilometers of terrain.
 - B. 100 to 200 square kilometers of terrain.
 - C. 200 to 300 square kilometers of terrain.
 - D. 300 to 400 square kilometers of terrain.
2. How does the former Soviets handle bypassed pockets of resistance?
 - A. Asks the enemy commander to surrender.
 - B. Bypassed enemyheld areas are sealed off and may be neutralized by the following echelons.
 - C. It doesn't, they continue their advance.
 - D. The local commander uses his battlefield nukes.
3. Why are motorized rifle units preferred over tank units when considering combat in cities?
 - A. Because of the manpower-intense, close-combat nature of combat in cities.
 - B. Logistical demands are greater for armored units than motorized units.
 - C. Motorized rifle units can move around more freely.
 - D. Tank units are restricted by obstacles and rubble common during an attack on urban terrain.
4. From the choices listed below, which one best describes what tank units are used for?
 - A. Assist the combat engineers.
 - B. Perform the indirect fire role until the assault groups artillery arrives.
 - C. Serve as a mobile reserve.
 - D. To aid in moving troops from one position to another.

5. It is unlikely that nuclear weapons would be used within a city. So, why would the former Soviets use non-persistent chemical weapons instead?
 - A. Because of their potential for human destruction without causing material damage.
 - B. Because the West used them first.
 - C. Howitzers and mortars are used for counterbattery tasks.
 - D. It would be cheaper than using nuclear weapons.
6. Which one of the choices listed below, is not a specific mission for reconnaissance units and groups from either division or regiment?
 - A. Identify command posts and communications centers.
 - B. Identify enemy withdrawal routes and successive defensive positions.
 - C. Identify low-flying aircraft.
 - D. Identify strongpoints within the city.
7. The former Soviets believe that the battalion commander can personally influence the conduct of an attack if he is how far behind the assault groups?
 - A. 100 to 200 meters behind the assault groups.
 - B. 200 to 300 meters behind the assault groups.
 - C. 300 to 400 meters behind the assault groups.
 - D. 400 to 500 meters behind the assault groups.
8. Besides supporting the infantry, what else are tanks used for?
 - A. To bring critical supplies through enemy fire.
 - B. To drive through buildings where there is no access.
 - C. To make breach holes in buildings using their main gun.
 - D. To neutralize enemy strongpoints.

Lesson 1

Practice Exercise Answer Key and Feedback

1. The requirements for combat in built-up areas create a
 - A. never ending void that will require forward elements to stop or suspend the attack.
 - B. need to reevaluate the mission of the attacking force.
 - C. need to train the force in dealing with terrorist and urban insurgents.
 - D. variety of troop control, maneuver, and equipment utilization problems.
2. Combat in urban terrain is expected to break down into a number of small-unit battles fought by battalions, companies, platoons, and squads or small assault groups in confined areas. These conditions create:
 - A. A greater demand for ammunition and rations, thus imposing unusual strains on logistics.
 - B. An ideal situation for small-unit leaders to use their initiative in controlling the battle.
 - C. The need for the use of weapons of mass destruction.
 - D. The immediate employment of the battalion engineer assets to establish breaching points.
3. Battlefield area evaluation for the urban battle involves the analysis of the urban area and a definition of the actual area to be considered. Of the choices listed below, which is not a consideration?
 - A. Is the Area of Operation (AO) a typical European town with narrow streets, circular configuration, and low-terrain location?
 - B. Is the mission combat or reconnaissance?
 - C. Is the threat a conventional force, an urban insurgency, a terrorist group, or a guerilla war that has spread to the urban area?
 - D. What are the political considerations of the operation?
4. Since military maps do not provide sufficient detail (too small a scale and are normally too outdated to be useful for purposes more detailed than general urban pattern analysis), what should be constructed for use in conjunction with or in lieu of city maps?
 - A. Plans published by the city.
 - B. Plans published by the state.
 - C. Photomosaics.
 - D. Overlays.

5. The layout of an urban area will normally follow a definite pattern which is easily identified by terrain analysts. What do the analysts recognize?
 - A. Two basic patterns and one basic subpattern.
 - B. Two basic patterns and two basic subpatterns.
 - C. Three basic patterns and two basic subpatterns.
 - D. Three basic patterns and three basic subpatterns.
6. The restrictive nature of urban terrain forces the analyst to be concerned with minimum rather than maximum
 - A. Load capacity for each soldier.
 - B. Use of force.
 - C. Use of radio communications.
 - D. Weapons ranges.
7. What kind of unit does the threat consider to be the most effective unit for urban combat for either offensive and defensive operations?
 - A. A motorized rifle battalion.
 - B. A motorized rifle company.
 - C. A motorized rifle platoon.
 - D. An airborne special operations unit.
8. A decision support template (DST) for urban operations must be the direct result of wargaming. How much area will the DST normally deal with?
 - A. 500 meters square.
 - B. Less than 1,000 meters square.
 - C. 1,500 meters square.
 - D. Less than 2,000 meters square.

LESSON 3

MILITARY OPERATIONS ON URBAN TERRAIN (DEFENSE)

OVERVIEW

LESSON DESCRIPTION:

In this lesson you will learn to perform a specific task required in planning for and conducting a defensive operation on urbanized terrain.

TERMINAL LEARNING OBJECTIVE:

ACTION: Identify the employment capabilities and limitations of combat, combat support, and combat service support assets available to a Battalion Task Force engaged in MOUT defense.

CONDITION: Given extracts of doctrinal literature, a tactical situation for a battalion TF S3, and a series of multiple-choice questions relating to Threat force offensive doctrine.

STANDARD: To demonstrate competency of the task, you must achieve a minimum of 70% on the subcourse examination.

REFERENCES: The material contained in this lesson was derived from the following publications: [FM 34-130](#), [FM 90-10-1](#), and FM 100-2-2.

INTRODUCTION

Successful combat operations in built-up areas depend on the proper employment of the rifle squad. Each member must be skilled in the techniques of combat in built-up areas: selecting and using firing positions, navigating in built-up areas, and camouflaging. Soldiers must remember to remain in buddy teams when moving through a MOUT environment.

CHARACTERISTICS AND CATEGORIES OF BUILT-UP AREAS

One of the first requirements for conducting operations in built-up areas is to understand the common characteristics and categories of such areas.

1. **Characteristics.** Built-up areas consist mainly of man-made features such as buildings. Buildings provide cover and concealment, limit fields of observation and fire, and block movement of troops, especially mechanized troops. Thick-walled buildings provide ready-made, fortified positions. Thin-walled buildings that have fields of observation and fire may also be important. Another important aspect is that built-up areas complicate, confuse and degrade command and control.

- a. Streets are usually avenues of approach. However, forces moving along streets are often canalized by the buildings and have little space for off-road maneuver. Thus, obstacles on streets in towns are usually more effective than those on roads in open terrain since they are more difficult to bypass.
- b. Subterranean systems found in some built-up areas are easily overlooked but can be important to the outcome of operations. These include subways, sewers, cellars, and utility systems ([Figure 3-1](#)).

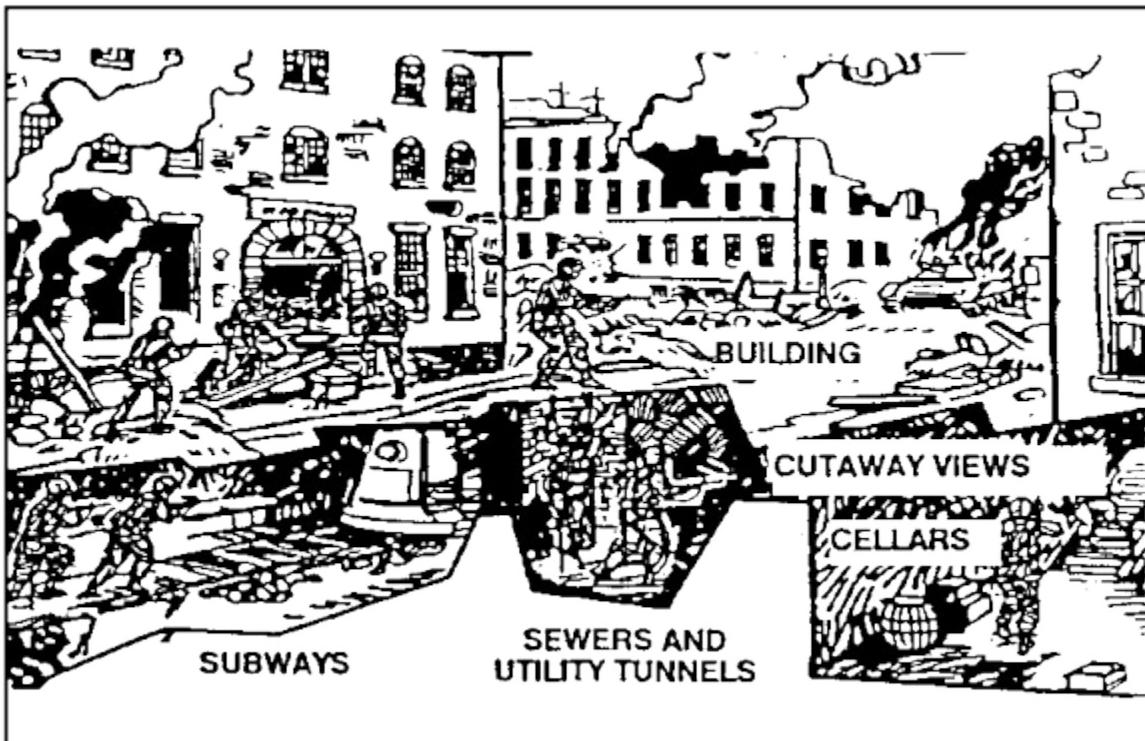


Figure 3-1. Underground systems.

2. Categories.

- a. Built-up areas are classified into four categories:
 - (1) Villages (population of 3,000 or less).
 - (2) Strip areas (urban areas built along roads connecting towns or cities).
 - (3) Towns or small cities (population up to 100,000 and not part of a major urban complex).
 - (4) Large cities with associated urban sprawl (population in the millions, covering hundreds of square kilometers).
- b. Each area affects operations differently. Villages and strip areas are commonly encountered by companies and battalions. Towns and small cities involve operations of entire brigades or divisions. Large cities and major urban complexes involve units up to corps size and above.

SPECIAL CONSIDERATIONS

Several considerations are addressed herein concerning combat in built-up areas.

1. Battles in Built-Up Areas. Battles in built-up areas usually occur when:

- a. A city is between two natural obstacles and there is no bypass.
- b. The seizure of a city contributes to the attainment of an overall objective.
- c. The city is in the path of a general advance and cannot be surrounded or bypassed.
- d. Political or humanitarian concerns require the seizure or retention of a city.

2. Target Engagement. In the city, the ranges of observation and fields of fires are reduced by structures as well as by the dust and smoke of battle. Targets are usually briefly exposed at ranges of 100 meters or less. As a result, combat in built-up areas consists mostly of close, violent combat. Infantry troops will use mostly light and medium antitank weapons, automatic rifles, machine guns, and hand grenades. Opportunities for using antitank guided missiles (ATGMs) are rare because of the short ranges involved and the many obstructions that interfere with missile flight.

3. Small-Unit Battles. Units fighting in built-up areas often become isolated, making combat a series of small-unit battles. Soldiers and small-unit leaders must have the initiative, skill, and courage to accomplish their missions while isolated from their parent units. A skilled, well-trained defender has tactical advantages over the attacker in this type of combat. He occupies strong static positions, whereas the attacker must be exposed in order to advance. Greatly reduced line-of-sight ranges, built-in obstacles, and compartmented terrain require the commitment of more troops for a given frontage. The troop density for both an attack and defense in built-up areas can be as much as three to five times greater than for an attack or defense in open terrain. Individual soldiers must be trained and psychologically ready for this type of operation.

4. Munitions and Special Equipment. Forces engaged in fighting in built-up areas use large quantities of munitions because of the need for reconnaissance by fire, which is due to short ranges and limited visibility. LAWs or AT-4s, rifle and machine gun ammunition, 40-mm grenades, hand grenades, and explosives are high-usage items in this type of fighting. Units committed to combat in built-up areas also must have special equipment such as grappling hooks, rope, snaplinks, collapsible pole ladders, rope ladders, construction material, axes, and sandbags. When possible, those items should be either stockpiled or brought forward on-call, so they are easily available to the troops.

5. Communications. Urban operations require centralized planning and decentralized execution. Therefore, communications play an important part. Commanders must trust their subordinates' initiative and skill, which can only occur through training. The state of a unit's training is a vital, decisive factor in the execution of operations in built-up areas.

- a. Wire is the primary means of communication for controlling the defense of a city and for enforcing security. However, wire can be compromised if interdicted by the enemy.
- b. Radio communication in built-up areas is normally degraded by structures and a high concentration of electrical power lines. Many buildings are constructed so that radio waves will

not pass through them. The new family of radios may correct this problem, but all units within the built-up area may not have these radios. Therefore, radio is an alternate means of communication.

c. Visual signals may also be used but are often not effective because of the screening effects of buildings, walls, and so forth. Signals must be planned, widely disseminated, and understood by all assigned and attached units. Increased noise makes the effective use of sound signals difficult.

d. Messengers can be used as another means of communication.

6. **Stress**. A related problem of combat in built-up areas is stress. Continuous close combat, intense pressure, high casualties, fleeting targets, and fire from a concealed enemy produce psychological strain and physical fatigue for the soldier. Such stress requires consideration for the soldiers' and small-unit leaders' morale and the unit's esprit de corps. Stress can be reduced by rotating units that have been committed to heavy combat for long periods.

7. **Restrictions**. The law of war prohibits unnecessary injury to noncombatants and needless damage to property. This may restrict the commander's use of certain weapons and tactics. Although a disadvantage at the time, this restriction may be necessary to preserve a nation's cultural institutions and to gain the support of its people. Units must be highly disciplined so that the laws of land warfare and rules of engagement (ROE) are obeyed. Leaders must strictly enforce orders against looting and expeditiously dispose of violations against the UCMJ.

8. **Fratricide Avoidance**. The overriding consideration in any tactical operation is the accomplishment of the mission. Commanders must consider fratricide in their planning process because of the decentralized nature of execution in the MOUT environment. However, they must weigh the risk of fratricide against losses to enemy fire when considering a given course of action. Fratricide is avoided by doctrine; by tactics, techniques, and procedures; and by training.

a. **Doctrine**. Doctrine provides the basic framework for accomplishment of the mission. Commanders must have a thorough understanding of US, joint, and host nation doctrine.

b. **Tactics, Techniques, and Procedures (TTP)**. TTP provide a "how-to" that everyone understands. TTP are disseminated in doctrinal manuals and SOPs.

(1) **Tactics**. Tactics is the employment of units in combat or the ordered arrangement and maneuver of units in relation to each other and or the enemy in order to use their full potential.

(2) **Techniques**. Techniques are the general and detailed methods used by troops or commanders to perform assigned missions and functions. Specifically, techniques are the methods of using weapons and personnel. Techniques describe a method, but not the only method.

(3) **Procedures**. Procedures are standard, detailed courses of action that describe how to accomplish a task.

(4) Planning. A simple, flexible maneuver plan that is disseminated to the lowest level of command will aid in the prevention of fratricide. Plans should make the maximum possible use of SOPs and battle drills at the user level. They should incorporate adequate control measures and fire support planning and coordination to ensure the safety of friendly troops and allow changes after execution begins.

(5) Execution. The execution of the plan must be monitored, especially with regard to the location of friendly troops and their relationship to friendly fires. Subordinate units must understand the importance of accurately reporting their position.

c. **Training**. The most important factor in the prevention of fratricide is individual and collective training in the many tasks that support MOUT.

(1) Situational Awareness. Well-trained soldiers accomplish routine tasks instinctively or automatically. This allows them to focus on what is happening on the battlefield. They can maintain an awareness of the relative location of enemy and friendly forces.

(2) Rehearsal. Rehearsal is simply training for the mission at hand. Commanders at every level must allow time for this critical task.

(3) Train to Standard. Soldiers that are trained to the Army standard are predictable. This predictability will be evident to any NCO or officer who may be required to lead them at a moments notice or who is observing their maneuvers to determine if they are friend or foe.

FIRING POSITIONS

Whether a unit is attacking, defending, or conducting retrograde operations, its success or failure depends on the ability of the individual soldier to place accurate fire on the enemy with the least exposure to return fire. Consequently, the soldier must immediately seek and properly use firing positions.

1. Hasty Firing Position. A hasty firing position is normally occupied in the attack or the early stages of the defense. It is a position from which the soldier can place fire upon the enemy while using available cover for protection from return fire. The soldier may occupy it voluntarily, or he may be forced to occupy it due to enemy fire. In either case, the position lacks preparation before occupation. Some of the more common hasty firing positions in a built-up area and techniques for occupying them are: corners of buildings, firing from behind walls, firing from windows, firing from unprepared loopholes, and firing from the peak of a roof.

a. **Corners of buildings**. The corner of a building provides cover for a hasty firing position if used properly.

(1) The firer must be capable of firing his weapon both right- and left-handed to be effective around corners. A common error made in firing around corners is firing from the wrong shoulder. This exposes more of the firer's body to return fire than necessary. By firing from the proper shoulder, the firer can reduce the target exposed to enemy fire.

(2) Another common mistake when firing around corners is firing from the standing position. The firer exposes himself at the height the enemy would expect a target to appear, and risks exposing the entire length of his body as a target for the enemy.

b. **Walls.** When firing behind walls, the soldier must fire around cover - not over it ([Figure 3-2](#)).



Figure 3-2. Soldier firing around cover.

c. **Windows.** In a built-up area, windows provide convenient firing ports. The soldier must avoid firing from the standing position since it exposes most of his body to return fire from the enemy and could silhouette him against a light-colored interior beyond the window. This is an obvious sign of the firer's position, especially at night when the muzzle flash can easily be observed. In using the proper method of firing from a window ([Figure 3-3](#)), the soldier is well back into the room to prevent the muzzle flash from being seen, and he is kneeling to limit exposure and avoid silhouetting himself.



Figure 3-3. Soldier firing from window.

d. **Loopholes.** The soldier may fire through a hole in the wall and avoid windows ([Figure 3-4](#)). He stays well back from the loophole so the muzzle of the weapon does not protrude beyond the wall, and the muzzle flash is concealed.

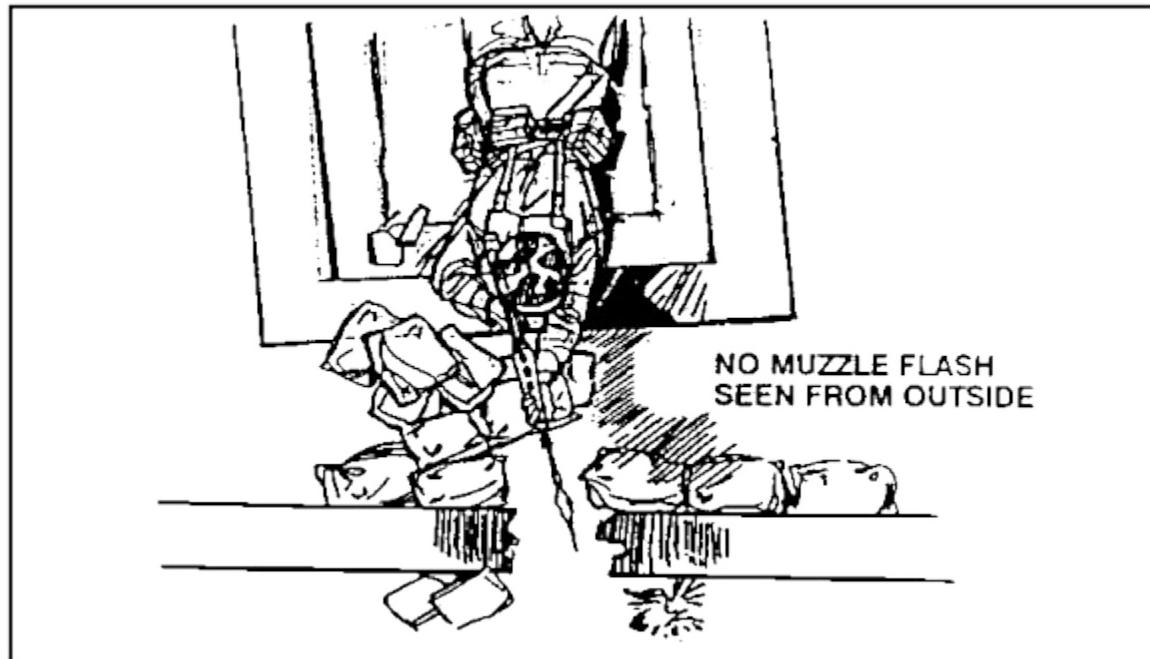


Figure 3-4. Soldier firing from loophole.

e. **Roof.** The peak of a roof provides a vantage point for snipers that increases their field of vision and the ranges at which they can engage targets ([Figure 3-5](#)). A chimney, a smokestack,

or any other object protruding from the roof of a building can reduce the size of the target exposed and should be used.

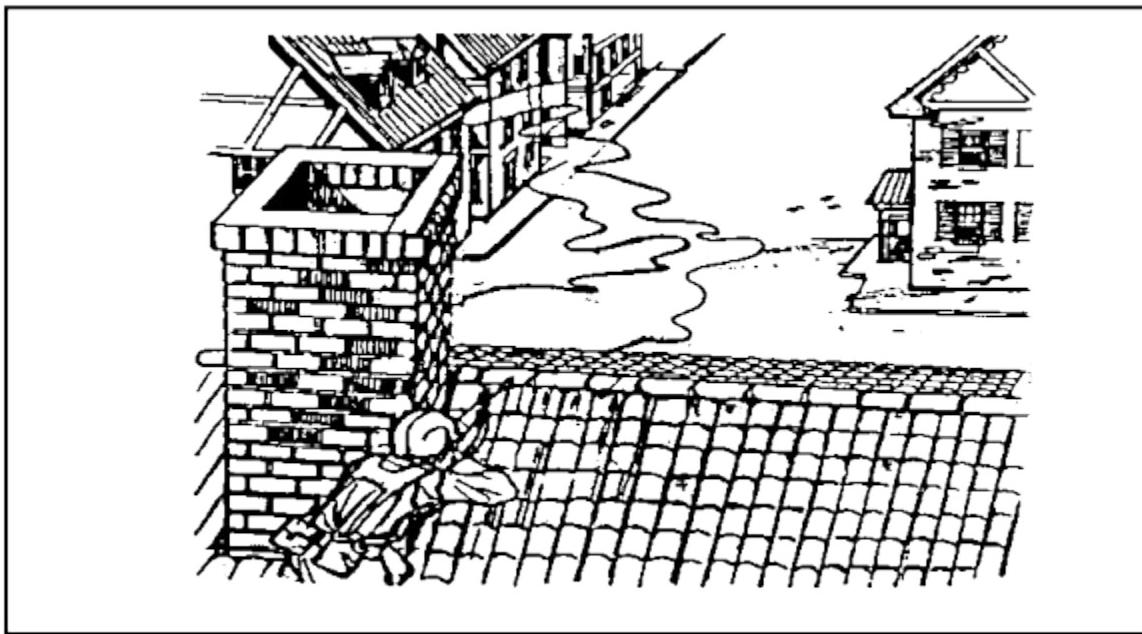


Figure 3-5. Soldier firing from oek of a roof.

f. No Position Available. When the soldier is subjected to enemy fire and none of the positions mentioned above are available, he must try to expose as little of himself as possible. When a soldier in an open area between buildings (a street or alley) is fired upon by enemy in one of the buildings to his front and no cover is available, he should lie prone as close as possible to a building on the same side of the open area as the enemy. To engage the soldier, the enemy must then lean out the window and expose himself to return fire.

g. No Cover Available. When no cover is available, target exposure can be reduced by firing from the prone position, by firing from shadows, and by presenting no silhouette against buildings.

2. Prepared Firing Position. A prepared firing position is one built or improved to allow the firer to engage a particular area, avenue of approach, or enemy position, reducing his exposure to return fire. Examples of prepared positions include: barricaded windows, fortified loopholes, sniper positions, anti-armor positions, and machine gun positions.

a. The natural firing port provided by windows can be improved by barricading the window, leaving a small hole for the firer's use ([Figure 3-6](#)). The barricading may be accomplished with materials torn from the interior walls of the building or any other available material. When barricading windows, avoid:

(1) Barricading only the windows that will be used as firing ports. The enemy will soon determine that the barricaded windows are firing positions.



Figure 3-6. Window firing position.

(2) Neat, square, or rectangular holes that are easily identified by the enemy. A barricaded window should not have a neat, regular firing port. The window should keep its original shape so that the position of the firer is hard to detect. Firing from the bottom of the window gives the firer the advantage of the wall because the firing port is less obvious to the enemy. Sandbags are used to reinforce the wall below the window and to increase protection for the firer. All glass must be removed from the window to prevent injury to the firer. Lace curtains permit the firer to see out and prevent the enemy from seeing in. Wet blankets should be placed under weapons to reduce dust. Wire mesh over the window keeps the enemy from throwing in hand grenades.

b. Although windows usually are good firing positions, they do not always allow the firer to engage targets in his sector.

(1) To avoid establishing a pattern of always firing from windows, an alternate position is required such as the prepared loophole ([Figure 3-7](#)). This involves cutting or blowing a small hole into the wall to allow the firer to observe and engage targets in his sector.

(2) Sandbags are used to reinforce the walls below, around, and above the loophole. Two layers of sandbags are placed on the floor under the firer to protect him from an explosion on a lower floor (if the position is on the second floor or higher). A wall of sandbags, rubble, furniture, and so on should be constructed to the rear of the position to protect the firer from explosions in the room.



Figure 3-7. Prepared loopholes.

- (3) A table, bedstead, or other available material provides overhead cover for the position. This prevents injury to the firer from falling debris or explosions above his position.
- (4) The position should be camouflaged by knocking other holes in the wall, making it difficult for the enemy to determine which hole the fire is coming from. Siding material should be removed from the building in several places to make loopholes less noticeable.
- c. A chimney or other protruding structure provides a base from which a sniper position can be prepared. Part of the roofing material is removed to allow the sniper to fire around the chimney. He should stand inside the building on the beams or on a platform with only his head and shoulders above the roof (behind the chimney). Sandbags placed on the sides of the position protect the sniper's flanks.
- d. When the roof has no protruding structure to provide protection ([Figure 3-8](#)), the sniper position should be prepared from underneath on the enemy side of the roof. The position is reinforced with sandbags, and a small piece of roofing material should be removed to allow the sniper to engage targets in his sector. The missing piece of roofing material should be the only sign that a position exists. Other pieces of roofing should be removed to deceive the enemy as

to the true sniper position. The sniper should be invisible from outside the building, and the muzzle flash must be hidden from view.

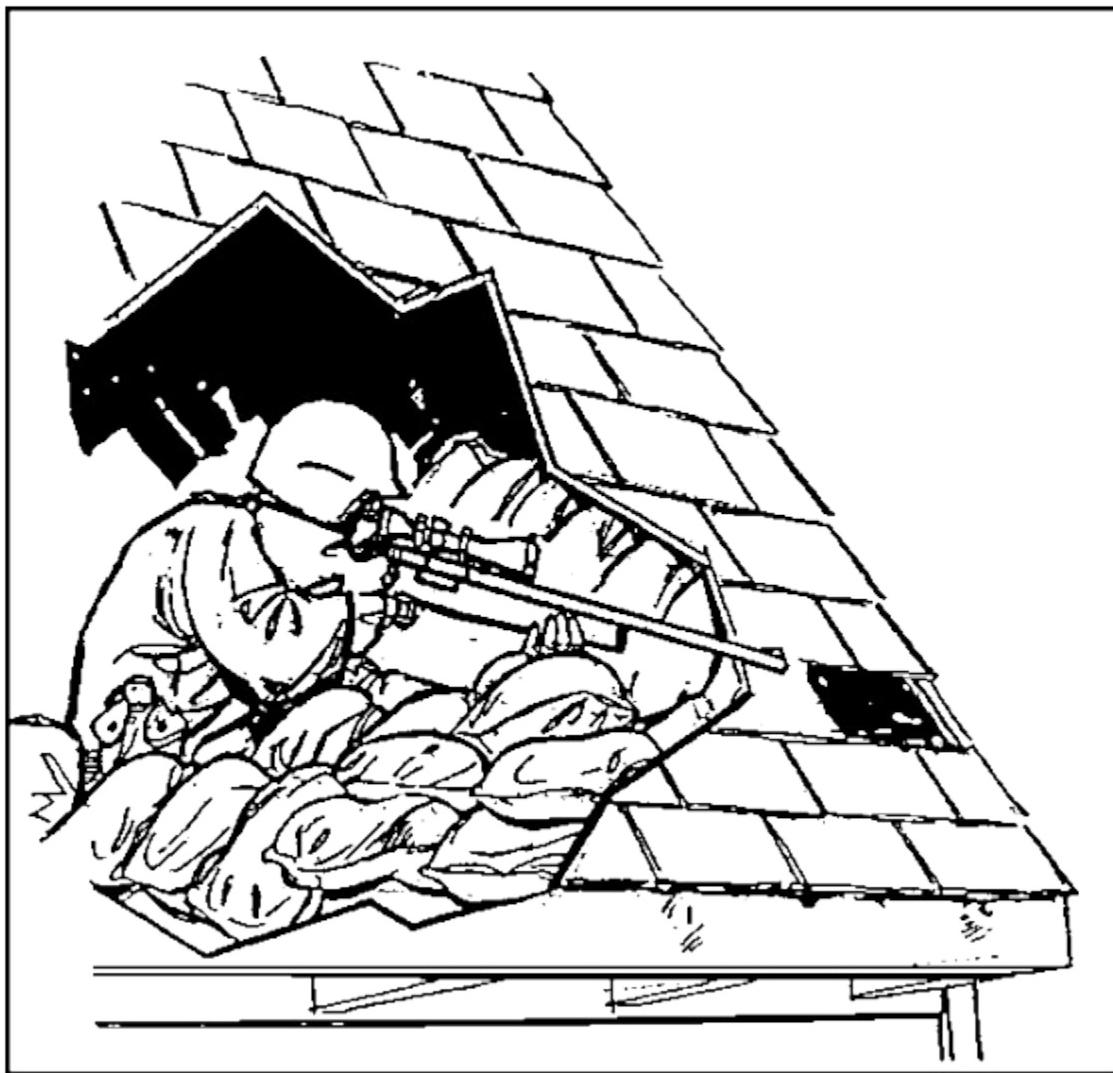


Figure 3-8. Sniper position.

- e. Some rules and considerations for selecting and occupying individual firing positions are:
- (1) Make maximum use of available cover and concealment.
 - (2) Avoid firing over cover; when possible, fire around it.
 - (3) Avoid silhouetting against light-colored buildings, the skyline, and so on.
 - (4) Carefully select a new firing position before leaving an old one.
 - (5) Avoid setting a pattern; fire from both barricaded and unbarriered windows.
 - (6) Keep exposure time to a minimum.
 - (7) Begin improving a hasty position immediately after occupation.

- (8) Use construction material for prepared positions that is readily available in a built-up area.
 - (9) Remember that positions that provide cover at ground level may not provide cover on higher floors.
- f. In attacking a built-up area, the recoilless weapon and ATGM crews are severely hampered in choosing firing positions due to the backblast of their weapons. They may not have enough time to knock out walls in buildings and clear backblast areas. They should select positions that allow the backblast to escape such as corner windows where the round fired goes out one window and the backblast escapes from another. The corner of a building can be improved with sandbags to create a firing position ([Figure 3-9](#)).



Figure 3-9. Corner firing position.

- g. The rifle squad during an attack on and in defense of a built-up area is often reinforced with attached antitank weapons. Therefore, the rifle squad leader must be able to choose good firing positions for the antitank weapons under his control.
- h. Various principles of employing antitank weapons have universal applications such as: making maximum use of available cover; trying to achieve mutual support; and allowing for the backblast when positioning recoilless weapons, TOWs, Dragons, and LAWs or AT4s.

- i. Operating in a built-up area presents new considerations. Soldiers must select numerous alternate positions, particularly when the structure does not provide cover from small-arms fire. They must position their weapons in the shadows and within the building.
- j. Recoilless weapons and ATGMs firing from the top of a building can use the chimney for cover ([Figure 3-10](#)). The rear of this position should be reinforced with sandbags.

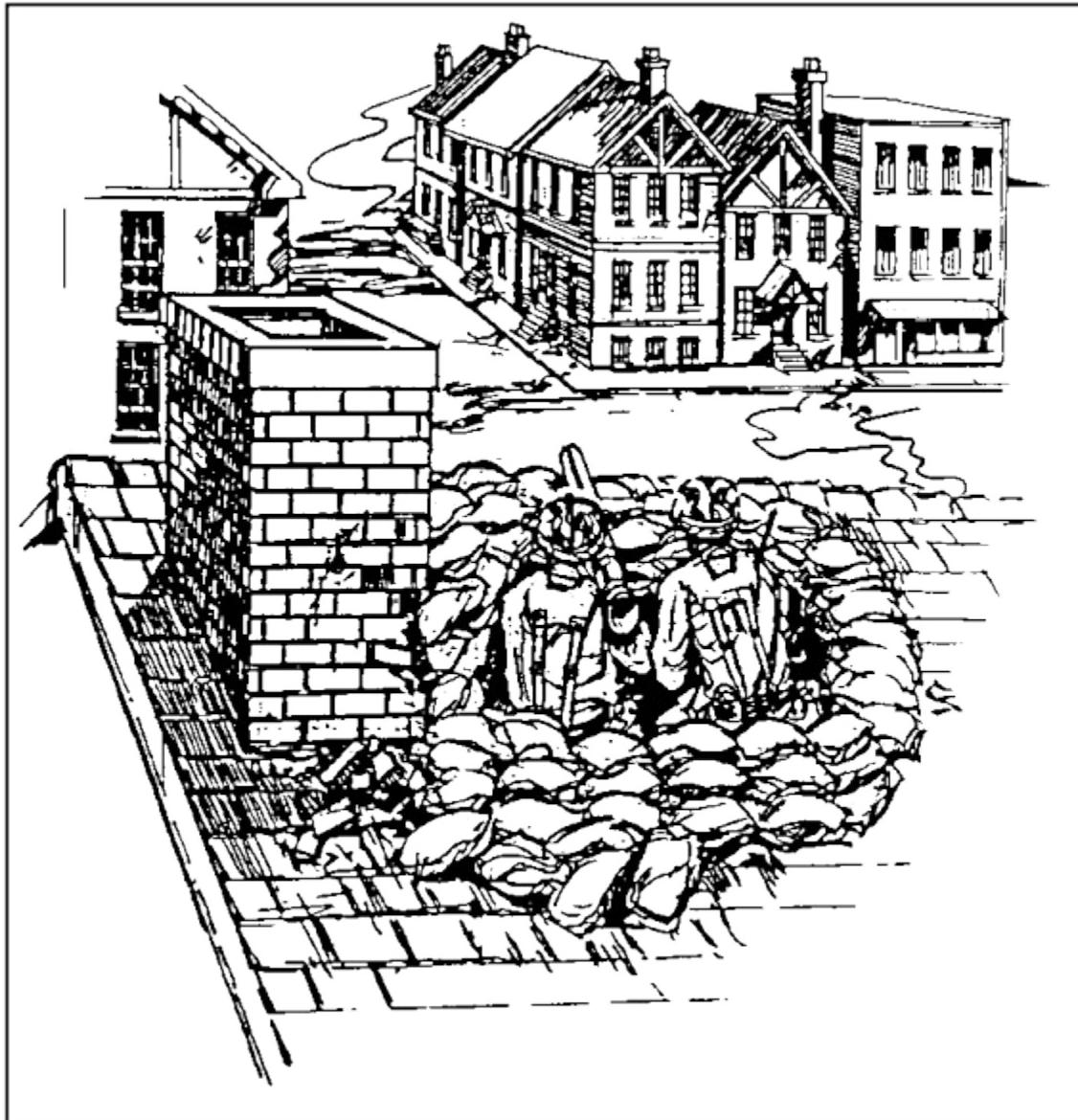


Figure 3-10. A recoilless weapon crew firing from a rooftop.

- k. When selecting firing positions for recoilless weapons and ATGMs, make maximum use of rubble, corners of buildings, and destroyed vehicles to provide cover for the crew. Recoilless weapons and ATGMs can also be moved along rooftops to obtain a better angle in which to engage enemy armor. When buildings are elevated, positions can be prepared using a building for overhead cover ([Figure 3-11](#)). The backblast under the building must not damage or collapse the building or injure the crew.



Figure 3-11. Prepared positions using a building for overhead cover.

NOTE:

When firing from a slope, ensure that the angle of the launcher relative to the ground or firing platform is not greater than 20 degrees. When firing within a building, ensure the enclosure is at least 10 feet by 15 feet, is clear of debris and loose objects, and has windows, doors, or holes in the walls for the backblast to escape.

- I. The machine gun has no backblast, so it can be emplaced almost anywhere. In the attack, windows and doors offer ready-made firing ports ([Figure 3-12](#)). For this reason, the enemy normally has windows and doors under observation and fire, which should be avoided. Any opening in walls that was created during the fighting may be used. When other holes are not present, small explosive charges can create loopholes ([Figure 3-13](#)). Regardless of what openings are used, machine guns should be within the building and in the shadows.

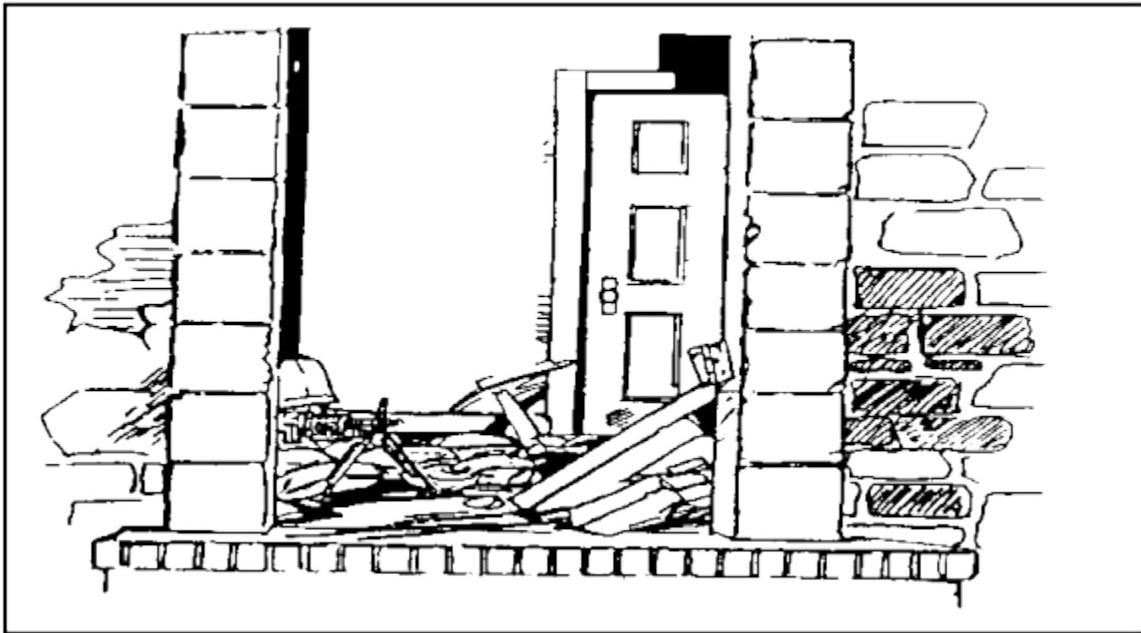


Figure 3-12. Employment of a machine gun in a doorway.



Figure 3-13. Use of a loophole with a machine gun.

- m. Upon occupying a building, soldiers board up all windows and doors. By leaving small gaps between the slots, soldiers can use windows and doors as good alternative firing positions.
- n. Loopholes should be used extensively in the defense. They should not be constructed in any logical pattern, nor should they all be at floor or table-top level. Varying their height and location makes them hard to pinpoint and identify. Dummy loopholes, shingles knocked off, or

holes cut that are not intended to be used as firing positions aid in the deception. Loopholes located behind shrubbery, under doorjams, and under the eaves of a building are hard to detect. In the defense, as in the offense, a firing position can be constructed using the building for overhead cover.

o. Increased fields of fire can be obtained by locating the machine gun in the corner of the building or sandbagged under a building ([Figure 3-14](#)). Available materials, such as desks, overstuffed chairs, couches, and other items of furniture, should be integrated into the construction of bunkers to add cover and concealment ([Figure 3-15](#)).

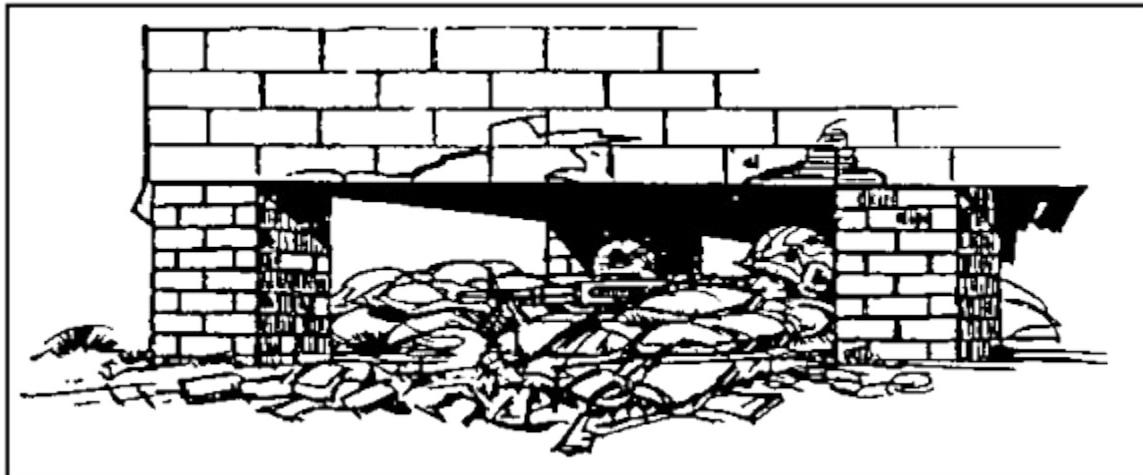


Figure 3-14. Sandbagged machine gun emplacement under a building.



Figure 3-15. Corner machine gun bunker.

p. Although grazing fire is desirable when employing the machine gun, it may not always be practical or possible. When destroyed vehicles, rubble, and other obstructions restrict the fields of grazing fire, the gun can be elevated to where it can fire over obstacles. Therefore, firing

from loopholes on second or third story may be necessary. A firing platform can be built under the roof ([Figure 3-16](#)) and a loophole constructed. Again, the exact location of the position must be concealed by knocking off shingles in isolated patches over the entire roof.



Figure 3-16. Firing platform built under roof.

3. Target Acquisition. Built-up areas provide unique challenges to units. Buildings mask movement and the effects of direct and indirect fires. The rubble from destroyed buildings, along with the buildings themselves, provide concealment and protection for attackers and defenders, making target acquisition difficult. A city offers definite avenues of approach that can easily be divided into sectors.

- a. The techniques of patrolling and using observation posts apply in the city as well as in wooded terrain. These techniques enable units to locate the enemy, to develop targets for direct and indirect fires in the defense, and to find uncovered avenues of approach in the offense.
- b. Most weapons and vehicles have distinguishing signatures. These come from design features or from the environment in which the equipment is used. For example, firing a tank main gun in dry, dusty, and debris-covered streets raises a dust cloud; a tank being driven in built-up areas produces more noise than one moving through an open field; soldiers moving through rubble on a street or in the halls of a damaged building create more noise than in a wooded area. Soldiers must recognize signatures so they can locate and identify targets. Seeing, hearing, and smelling

assist in detecting and identifying signatures that lead to target location, identification, and rapid engagement. Soldiers must look for targets in areas where they are most likely to be employed.

- c. Target acquisition must be continuous, whether halted or moving. Built-up areas provide both the attacker and defender with good cover and concealment, but it usually favors the defender because of the advantages achieved. This makes target acquisition extremely important since the side that fires first may win the engagement.
- d. When a unit is moving and enemy contact is likely, the unit must have an overwatching element. This principle applies in built-up areas as it does in other kinds of terrain except that the overwatching element must observe both the upper floors of buildings and street level.
- e. Stealth should be used when moving in built-up areas since little distance separates attackers and defenders. Only arm-and-hand signals should be used until contact is made. The unit should stop periodically to listen and watch, ensuring it is not being followed or that the enemy is not moving parallel to the unit's flank for an ambush. Routes should be carefully chosen so that buildings and piles of rubble can be used to mask the unit's movement.
- f. Observation duties must be clearly given to squad members to ensure all-round security as they move. This security continues at the halt. All the senses must be used to acquire targets, especially hearing and smelling. Soldiers soon recognize the sounds of vehicles and people moving through streets that are littered with rubble. The smell of fuel, cologne, and food cooking can disclose enemy positions.
- g. Observation posts are positions from which soldiers can watch and listen to enemy activity in a specific sector. They warn the unit of an enemy approach and are ideally suited for built-up areas. OPs can be positioned in the upper floors of buildings, giving soldiers a better vantage point than at street level.
- h. In the defense, a platoon leader positions OPs for local security as ordered by the company commander. The platoon leader selects the general location but the squad leader sets up the OP ([Figure 3-17](#)). Normally, there is at least one OP for each platoon. An OP consists of two to four men and is within small-arms supporting range of the platoon. Leaders look for positions that have good observation of the target sector. Ideally, an OP has a field of observation that overlaps those of adjacent OPs. The position selected for the OP should have cover and concealment for units moving to and from the OP. The upper floors of houses or other buildings should be used. The squad leader should not select obvious positions, such as water towers or church steeples, that attract the enemy's attention.

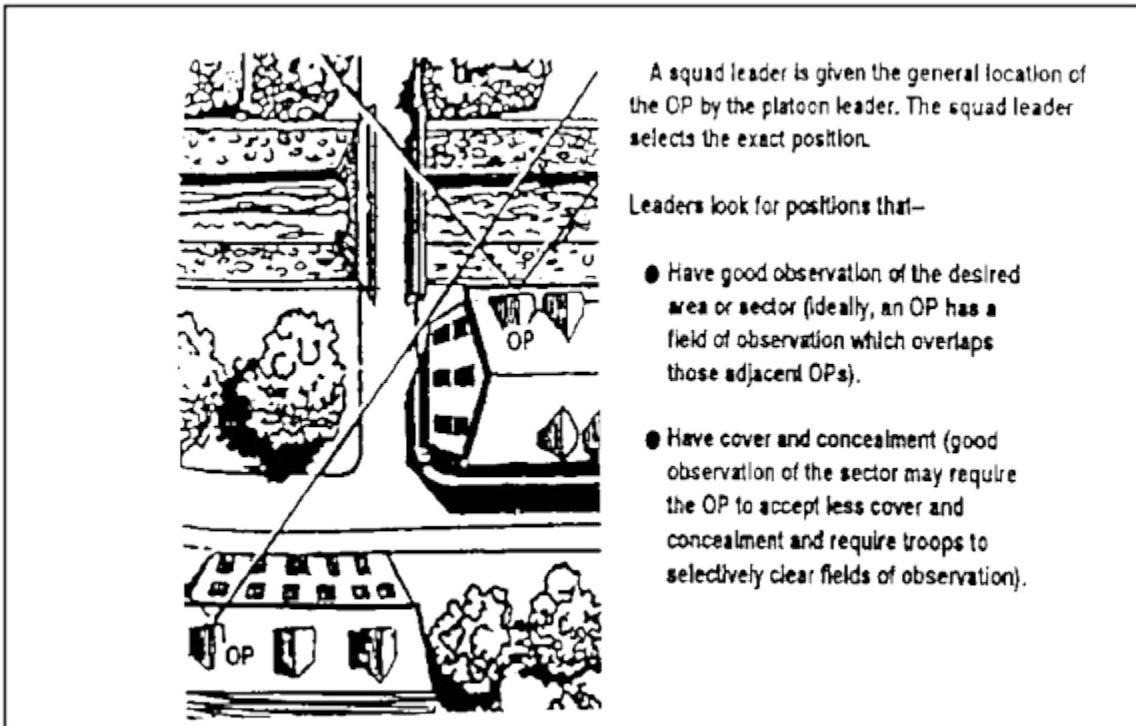


Figure 3-17. Selection of OP location.

- i. The soldier should be taught how to scan a target area from OPs or from his fighting positions. Use of proper scanning techniques enable squad members to quickly locate and identify targets. Without optics, the soldier searches quickly for obvious targets, using all his senses to detect target signatures. If no targets are found and time permits, he makes a more detailed search (using binoculars, if available) of the terrain in the assigned sector using the 50-meter method. First, he searches a strip 50 meters deep from right to left; then he searches a strip from left to right that is farther out, overlapping the first strip. This process is continued until the entire sector is searched. In the city core or core periphery where the observer is faced with multistory buildings, the overlapping sectors may be going up rather than out.
- j. Soldiers who man OPs and other positions should employ target acquisition devices. These devices include binoculars, image intensification devices, thermal sights, GSR, remote sensors (REMs) and platoon early warning systems (PEWS). All of these devices can enhance the units ability to detect and engage targets. Several types of devices should be used since no single device can meet every need of a unit. A mix might include PEWS sensors to cover out-of-sight areas and dead space, image intensification devices for close range, thermal sights for camouflage, and smoke penetration for low light conditions. A mix of devices is best because several devices permit overlapping sectors and more coverage, and the capabilities of one device can compensate for limitations of another.
- k. Target acquisition techniques used at night are similar to those used during the day. At night, whether using daylight optics or the unaided eye, a soldier does not look directly at an object but a few degrees off to the side. The side of the eye is more sensitive to dim light. When scanning with off-center vision, he moves his eyes in short, abrupt, irregular moves. At each likely target area, he pauses a few seconds to detect any motion.

i. Sounds and smells can aid in acquiring targets at night since they transmit better in the cooler, damper, night air. Running engines, vehicles, and soldiers moving through rubble-covered streets can be heard for great distances. Odors from diesel fuel, gasoline, cooking food, burning tobacco, after-shave lotion, and so on reveal enemy and friendly locations.

4. Flame Operations. Incendiary ammunition, special weapons, and the ease with which incendiary devices can be constructed from gasoline and other flammables make fire a true threat in built-up area operations. During defensive operations, firefighting should be a primary concern. The proper steps must be taken to reduce the risk of a fire that could make a chosen position indefensible.

a. Soldiers choose or create positions that do not have large openings. These positions provide as much built-in cover as possible to prevent penetration by incendiary ammunition. All unnecessary flammable materials are removed, including ammunition boxes, rugs, newspapers, curtains, and so on. The electricity and gas coming into the building must be shut off.

b. A building of concrete block construction, with concrete floors and a tin roof, is an ideal place for a position. However, most buildings have wooden floors or subfloors, wooden rafters, and wooden inner walls, which require improvement. Inner walls are removed and replaced with blankets to resemble walls from the outside. Sand is spread 2 inches deep on floors and in attics to retard fire.

c. All available firefighting gear is pre-positioned so it can be used during actual combat. For the individual soldier, such gear includes entrenching tools, helmets, sand, and blankets. These items are supplemented with fire extinguishers that are not in use.

d. Fire is so destructive that it can easily overwhelm personnel regardless of extraordinary precautions. Soldiers plan routes of withdrawal so that a priority of evacuation can be sent from fighting positions. This allows soldiers to exit through areas that are free from combustible material and provide cover from enemy direct fire.

e. The confined space and large amounts of combustible material in built-up areas can influence the enemy to use incendiary devices. Two major first-aid problems that are more urgent than in the open battlefield are: burns, and smoke and flame inhalation, which creates a lack of oxygen. These can easily occur in buildings and render the victim combat ineffective. Although there is little defense against flame inhalation and lack of oxygen, smoke inhalation can be greatly reduced by wearing the individual protective mask. Regardless of the fire hazard, defensive planning for combat in built-up areas must include aidmen. Aidmen must reach victims and their equipment, and must have extra supplies for the treatment of burns and inhalation injuries.

5. Employment of Snipers. The value of the sniper to a unit operating in a built-up area depends on several factors. These factors include the type of operation, the level of conflict, and the rules of engagement. Where ROE allow destruction, the snipers may not be needed since other weapons systems available to a mechanized force have greater destructive effect. However, they can contribute to the fight. Where the ROE prohibit collateral damage, snipers may be the most valuable tool the commander has. (See [FM 7-20](#); [FM 71-2](#), C1; and [TC 23-14](#) for more information.)

- a. Sniper effectiveness depends in part on the terrain. Control is degraded by the characteristics of an urban area. To provide timely and effective support, the sniper must have a clear picture of the commander's concept of operation and intent.
- b. Snipers should be positioned in buildings of masonry construction. These buildings should also offer long-range fields of fire and all-round observation. The sniper has an advantage because he does not have to move with, or be positioned with, lead elements. He may occupy a higher position to the rear or flanks and some distance away from the element he is supporting. By operating far from the other elements, a sniper avoids decisive engagement but remains close enough to kill distant targets that threaten the unit. Snipers should not be placed in obvious positions, such as church steeples and roof tops, since the enemy often observes these and targets them for destruction. Indirect fires can generally penetrate rooftops and cause casualties in top floors of buildings. Also snipers should not be positioned where there is heavy traffic; these areas invite enemy observation as well.
- c. Snipers should operate throughout the area of operations, moving with and supporting the companies as necessary. Some teams may operate independent of other forces. They search for targets of opportunity, especially for enemy snipers. The team may occupy multiple positions. A single position may not afford adequate observation for the entire team without increasing the risk of detection by the enemy. Separate positions must maintain mutual support. Alternate and supplementary positions should also be established in urban areas.
- d. Snipers may be assigned tasks such as the following:
 - (1) Killing enemy snipers (countersniper fire).
 - (2) Killing targets of opportunity. These targets may be prioritized by the commander. Types of targets might include enemy snipers, leaders, vehicle commanders, radio men, sappers, and machine gun crew.
 - (3) Denying enemy access to certain areas or avenues of approach (controlling key terrain).
 - (4) Providing fire support for barricades and other obstacles.
 - (5) Maintaining surveillance of flank and rear avenues of approach (screening).
 - (6) Supporting local counterattacks with precision fire.

NAVIGATION IN BUILT-UP AREAS

Built-up areas present a different set of challenges involving navigation. Deep in the city core, the normal terrain features depicted on maps may not apply - buildings become the major terrain features and units become tied to streets. Fighting in the city destroys buildings whose rubble blocks streets. Street and road signs are destroyed during the fighting if they are not removed by the defenders. Operations in subways and sewers present other unique challenges. However, maps and photographs are available to help the unit overcome these problems. The global positioning system (GPS) can provide navigation abilities in built-up areas.

1. Military Maps. The military city map is a topographical map of a city that is usually a 1:12,500 scale, delineating streets and showing street names, important buildings, and other urban elements. The scale of a city map can vary from 1:25,000 to 1:50,000, depending on the importance and size of the city, density of detail, and intelligence information.

- a. Special maps, prepared by supporting topographic engineers, can assist units in navigating in built-up areas. These maps have been designed or modified to give information not covered on a standard map, which includes maps of road and bridge networks, railroads, built-up areas, and electric power fields. They can be used to supplement military city maps and topographical maps.
- b. Once in the built-up area, soldiers use street intersections as reference points much as hills and streams in rural terrain. City maps supplement or replace topographic maps as the basis of navigation. These maps enable units moving in the built-up area to know where they are and to move to new locations even though streets have been blocked or a key building destroyed.
- c. The old techniques of compass reading and pace counting can still be used, especially in a blacked-out city where street signs and buildings are not visible. The presence of steel and iron in the MOUT environment may cause inaccurate compass readings. Sewers must be navigated much the same way. Maps providing the basic layout of the sewer system are maintained by city sewer departments. This information includes directions the sewer lines run and distances between manhole covers. Along with basic compass and pace count techniques, such information enables a unit to move through the city sewers.
- d. Operations in a built-up area adversely affect the performance of sophisticated electronic devices such as GPS and data distribution systems. These systems function the same as communications equipment - by line-of-sight. They cannot determine underground locations or positions within a building. These systems must be employed on the tops of buildings, in open areas, and down streets where obstacles will not affect line of sight readings.
- e. City utility workers are assets to units fighting in built-up areas. They can provide maps of sewers and electrical fields, and information about the city. This is important especially with regard to the use of the sewers. Sewers can contain pockets of methane gas that are highly toxic to humans. City sewer workers know the locations of these danger areas and can advise a unit on how to avoid them.

2. Global Positioning Systems. Most global positioning systems use a triangular technique using satellites to calculate their position. Preliminary tests have shown that GPS are not affected by small built-up areas, such as villages. However, large built-up areas with a mixture of tall and short buildings cause some degradation of most GPS. This effect may increase as the system is moved into an interior of a large building or taken into subterranean areas.

3. Aerial Photographs. Current aerial photographs are also excellent supplements to military city maps and can be substituted for a map. A topographic map or military city map could be obsolete if compiled many years ago. A recent aerial photograph shows changes that have taken place since the map was made. This could include destroyed buildings and streets that have been blocked by rubble as well as

enemy defensive preparations. More information can be gained by using aerial photographs and maps together than using either one alone.

CAMOUFLAGE

To survive and win in combat in built-up areas, a unit must supplement cover and concealment with camouflage. To properly camouflage men, carriers, and equipment, soldiers must study the surrounding area and make positions look like the local terrain.

1. Application. Only the material needed for camouflaging a position should be used since excess material could reveal the position. Material must be obtained from a wide area. For example, if defending a cinder block building, do not strip the front, sides, or rear of the building to camouflage a position.
 - a. Buildings provide numerous concealed positions. Armored vehicles can often find isolated positions under archways or inside small industrial or commercial structures. Thick masonry, stone, or brick wall offer excellent protection from direct fire and provide concealed routes.
 - b. After camouflage is completed, the soldier inspects positions from the enemy's viewpoint. He makes routine checks to see if the camouflage remains natural looking and actually conceals the position. If it does not look natural, the soldier must rearrange or replace it.
 - c. Positions must be progressively camouflaged as they are prepared. Work should continue until all camouflage is complete. When the enemy has air superiority, work may be possible only at night. Shiny or light-colored objects that attract attention from the air must be hidden.
 - d. Shirts should be worn since exposed skin reflects light and attracts the enemy. Even dark skin reflects light because of its natural oils.
 - e. Camouflage face paint is issued in three standard, two-tone sticks. When issue-type face paint sticks are not available, burnt cork, charcoal, or lampblack can be used to tone down exposed skin. Mud may be used as a last resort since it dries and may peel off, leaving the skin exposed; it may also contain harmful bacteria.
2. Use of Shadows. Buildings in built-up areas throw sharp shadows, which can be used to conceal vehicles and equipment ([Figure 3-18](#)). Soldiers should avoid areas that are not in shadows. Vehicles may have to be moved periodically as shadows shift during the day. Emplacements inside buildings provide better concealment.

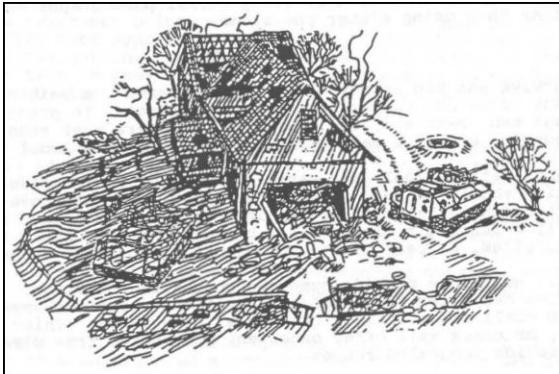


Figure 3-18. Use of shadows for concealment.

- a. Soldiers should avoid the lighted areas around windows and loopholes. They will be better concealed if they fire from the shadowed interior of a room ([Figure 3-19](#)).
- b. A lace curtain or piece of cheesecloth provides additional concealment to soldiers in the interior of rooms if curtains are common to the area. Interior lights are prohibited.

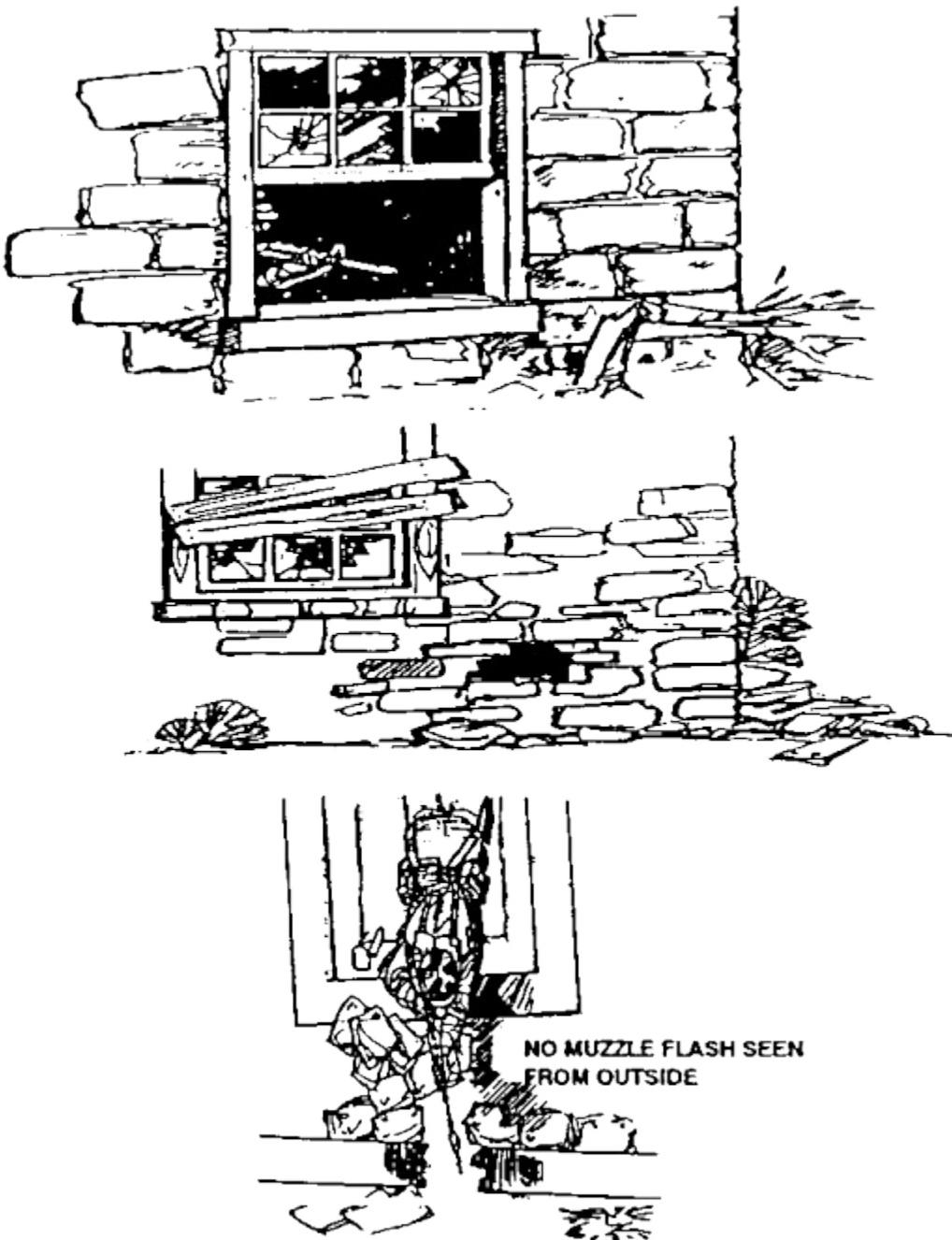


Figure 3-19. Concealment inside a building.

3. Color and Texture. Standard camouflage pattern painting of equipment is not as effective in built-up areas as a solid, dull, dark color hidden in shadows. Since repainting vehicles before entering a built-up area is not always practical, the lighter sand-colored patterns should be subdued with mud or dirt.

- a. The need to break up the silhouette of helmets and individual equipment exists in built-up areas the same as it does elsewhere. However, burlap or canvas strips are a more effective

camouflage than foliage ([Figure 3-20](#)). Predominant colors are normally browns, tans, and sometimes grays rather than greens, but each camouflage location should be evaluated.



Figure 3-20. Helmet camouflaged with burlap strips.

- b. Weapons emplacements should use a wet blanket ([Figure 3-21](#)), canvas, or cloth to keep dust from rising when the weapon is fired.



Figure 3-21. Wet blanket used to keep dust down.

- c. Command posts and logistical emplacements are easier to camouflage and better protected if located underground. Antennas can be moved to upper stories or to higher buildings based on remote capabilities. Field telephone wire should be laid in conduits, in sewers, or through buildings.
- d. Soldiers should consider the background to ensure that they are not silhouetted or skylined, but rather blend into their surroundings. To defeat enemy urban camouflage, soldiers should be alert for common camouflage errors such as the following:
 - (1) Tracks or other evidence of activity.
 - (2) Shine or shadows.
 - (3) An unnatural color or texture.
 - (4) Muzzle flash, smoke, or dust.
 - (5) Unnatural sounds and smells.
 - (6) Movement.
- e. Dummy positions can be used effectively to distract the enemy and make him reveal his position by firing.
- f. Built-up areas afford cover, resources for camouflage, and locations for concealment. The following basic rules of cover, camouflage, and concealment should be adhered to:
 - (1) Use the terrain and alter camouflage habits to suit your surroundings.
 - (2) Employ deceptive camouflage of buildings.
 - (3) Continue to improve positions. Reinforce fighting positions with sandbags or other fragment- and blast-absorbent material.
 - (4) Maintain the natural look of the area.
 - (5) Keep positions hidden by clearing away minimal debris for fields of fire.
 - (6) Choose firing ports in inconspicuous spots when available.

NOTE:

Remember that a force that **COVERS** and **CONCEALS** itself has a significant advantage over a force that does not.

Lesson 3

Practice Exercise 3-1

Instructions The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

1. Which of the following is not classified as one of the categories of built-up areas?
 - A. Large cities.
 - B. Provinces.
 - C. Small cities.
 - D. Villages.
2. In a MOUT environment, a hasty firing position is normally occupied in the attack or
 - A. During a temporary halt.
 - B. During preparation for a counterattack.
 - C. The early stages of the defense.
 - D. When no other firing positions exists.
3. A wall of sandbags, rubble, furniture or what ever can be found, is positioned so as to protect the firer from what type of danger?
 - A. Artillery fire.
 - B. Being detected.
 - C. Explosions in the room.
 - D. Sniper fire.
4. When selecting firing positions in buildings for recoilless weapons and ATGMs, which of the following precautions must be taken into consideration to prevent injury to the crew?
 - A. All crew members should wear ear protection.
 - B. Position sandbags around the weapon.
 - C. The backblast must not damage or collapse the building.
 - D. Weapons position blends in with the environment.

5. Since most buildings have wooden floors and subfloors, which of the following measures would best retard fire?
 - A. Build the firing position outside of building.
 - B. Use nonflammable materials for firing position.
 - C. Keep floors damp mopped.
 - D. Spread sand on the floors 2 inches deep.
6. When employing a sniper, what advantage does he have over lead (friendly) elements?
 - A. A sniper is hard to detect.
 - B. He does not have to move with, or be positioned with, lead elements.
 - C. Since he operates alone, his movements won't be detected as easily as the lead element.
 - D. The sniper can shoot and scoot.
7. At the firing positions, after camouflage is completed, the soldier
 - A. Installs Claymores to his front.
 - B. Inspects positions from the enemy's viewpoint.
 - C. Sets out his defensive tripflares.
 - D. Takes a break.
8. Command posts and logistical emplacements are easier to camouflage and better protected if
 - A. Air defense assets are available.
 - B. Camouflaged with camouflage nets.
 - C. Guards are posted around these installations.
 - D. Located underground.
9. A technique that can be used effectively to distract the enemy and make him reveal his position by firing, is
 - A. By setting up silhouette targets to look like friendly troops, and positioned well away from your location.
 - B. Employing dummy positions.
 - C. To have a soldier stand up and draw fire.
 - D. To send out teams to reconnoiter the area.

10. Which of the following best describes why soldiers should wear their shirts while defending in a MOUT environment?

- A. Because exposed skin, even dark skin (because of its natural oils) reflects light and attracts the enemy.
- B. Because the debris caused by broken windows and building materials can cause injury to soldiers.
- C. During extreme cold, the soldiers ability to maintain his body heat is reduced.
- D. During extreme heat, the soldiers are exposed the direct sunlight, and can get sunburned.

Practice Exercise 3-1

Answer Key and Feedback

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 - D. During extreme heat, the soldiers are exposed to the direct sunlight, and can get sunburned.

COMBAT SUPPORT

Combat support is fire support and other assistance provided to combat elements. It normally includes field artillery, air defense, aviation (less air cavalry), engineers, military police, communications, electronic warfare, and NBC.

1. **Mortars.** Mortars are the most responsive indirect fires available to battalion and company commanders. Their mission is to provide close and immediate fire support to the maneuver units. Mortars are well suited for combat in built-up areas because of their high rate of fire, steep angle of fall, and short minimum range. Battalion and company commanders must plan mortar support with the FSO as part of the total fire support system. (See [FM 7-90](#) for detailed information on the tactical employment of mortars.)

a. **Role of Mortar Units.** The role of mortar units is to deliver suppressive fires to support maneuver, especially against dismounted infantry. Mortars can be used to obscure, neutralize, suppress, or illuminate during MOUT. Mortar fires inhibit enemy fires and movement, allowing friendly forces to maneuver to a position of advantage. Effectively integrating mortar fires with dismounted maneuver is key to successful combat in a built-up area at the rifle company and battalion level.

b. **Position Selection.** The selection of mortar positions depends on the size of buildings, the size of the urban area, and the mission. Also, rubble can be used to construct a parapet for firing positions.

(1) The use of existing structures (for example, garages, office buildings, or highway overpasses) for hide positions is recommended to afford maximum protection and minimize the camouflage effort. By proper use of mask, survivability can be enhanced. If the mortar has to fire in excess of 885 mils to clear a frontal mask, the enemy counterbattery threat is reduced. These principles can be used in both the offense and the defense.

(2) Mortars should not be mounted directly on concrete; however, sandbags may be used as a buffer. Sandbags should consist of two or three layers; be butted against a curb or wall; and extend at least one sandbag width beyond the baseplate.

(3) Mortars are usually not placed on top of buildings because lack of cover and mask makes them vulnerable. They should not be placed inside buildings with damaged roofs unless the structure's stability has been checked. Overpressure can injure personnel, and the shock on the floor can weaken or collapse the structure.

c. **Communications.** An increased use of wire, messenger, and visual signals will be required. However, wire should be the primary means of communication between the forward observers, fire support team, fire direction center, and mortars since elements are close to each other. Also, FM radio transmissions in

built-up areas are likely to be erratic. Structures reduce radio ranges; however, moving antennas to upper floors or roofs may improve communications and enhance operator survivability.

Another technique that applies is the use of radio retransmissions. A practical solution is to use existing civilian systems to supplement the unit's capability.

d. Magnetic Interference. In an urban environment, all magnetic instruments are affected by surrounding structural steel, electrical cables, and automobiles. Minimum distance guidelines for the use of the M2 aiming circle ([FM 23-90](#)) will be difficult to apply. To overcome this problem, an azimuth is obtained to a distant aiming point. From this azimuth, the back azimuth of the direction of fire is subtracted. The difference is indexed on the red scale and the gun manipulated until the vertical cross hair of the sight is on the aiming point. Such features as the direction of a street may be used instead of a distant aiming point.

e. High-Explosive Ammunition. During MOUT, mortar HE fires are used more than any other type of indirect fire weapon. The most common and valuable use for mortars is often harassment and interdiction fires. One of their greatest contributions is interdicting supplies, evacuation efforts, and reinforcement in the enemy rear just behind his forward defensive positions. Although mortar fires are often targeted against roads and other open areas, the natural dispersion of indirect fires will result in many hits on buildings. Leaders must use care when planning mortar fires during MOUT to minimize collateral damage.

(1) High-explosive ammunition, especially the 120-mm projectile, gives good results when used on lightly built structures within cities. However, it does not perform well against reinforced concrete found in larger urban areas.

(2) When using HE ammunition in urban fighting, only point detonating fuzes should be used. The use of proximity fuzes should be avoided, because the nature of built-up areas causes proximity fuzes to function prematurely. Proximity fuzes, however, are useful in attacking targets such as OPs on tops of buildings.

(3) During both World War II and recent Middle East conflicts, light mortar HE fires have been used extensively during MOUT to deny the use of streets, parks, and plazas to enemy personnel.

f. Illumination. In the offense, illuminating rounds are planned to burst above the objective to put enemy troops in the light. If the illumination is behind the objective, the enemy troops would be in the shadows rather than in the light. In the defense, illumination is planned to burst behind friendly troops to put them in the shadows and place the enemy troops in the light. Buildings reduce the effectiveness of the illumination by creating shadows. Continuous illumination requires close coordination between the FO and FDC to produce the proper effect by bringing the illumination over the defensive positions as the enemy troops approach the buildings.

g. Special Considerations. When planning the use of mortars, commanders must consider the following:

(1) FOs should be positioned on tops of buildings so target acquisition and adjustments in fire can best be accomplished.

(2) Commanders must understand ammunition effects to correctly estimate the number of volleys needed for the specific target coverage. Also, the effects of using WP or LP may create unwanted smoke screens or limited visibility conditions that could interfere with the tactical plan.

(3) FOs must be able to determine dead space. Dead space is the area in which fires cannot reach the street level because of buildings. This area is a safe haven for the enemy. For mortars, the dead space is about one-half the height of the building.

(4) Mortar crews should plan to provide their own security.

(5) Commanders must give special consideration to where and when mortars are to displace while providing immediate indirect fires to support the overall tactical plan. Combat in built-up areas adversely affects the ability of mortars to displace because of rubble and the close nature of MOUT.

2. Field Artillery. A field artillery battalion is normally assigned the tactical mission of direct support (DS) to a maneuver brigade. A battery may not be placed in DS of a battalion task force, but may be attached.

a. Appropriate fire support coordination measures should be carefully considered since fighting in built-up areas results in opposing forces fighting in close combat. When planning for fire support in a built-up area, the battalion commander in coordination with his FSO, considers the following.

(1) Target acquisition may be more difficult because of the increased cover and concealment afforded by the terrain. Ground observation is limited in built-up areas, therefore, FOs should be placed on tops of buildings. Adjusting fires is difficult since buildings block the view of adjusting rounds; therefore, the lateral method of adjustment should be used.

(2) Initial rounds are adjusted laterally until a round impacts on the street perpendicular to the FEBA. Airburst rounds are best for this adjustment. The adjustments must be made by sound. When rounds impact on the perpendicular street, they are adjusted for range. When the range is correct, a lateral shift is made onto the target and the gunner fires for effect.

(3) Special consideration must be given to shell and fuze combinations when effects of munitions are limited by buildings.

(a) Careful use of VT is required to avoid premature arming.

(b) Indirect fires may create unwanted rubble.

(c) The close proximity of enemy and friendly troops requires careful coordination.

(d) WP may create unwanted fires and smoke.

(e) Fuze delay should be used to penetrate fortifications .

(f) Illumination rounds can be effective; however, friendly positions should remain in shadows and enemy positions should be highlighted. Tall buildings may mask the effects illumination rounds.

(g) VT, TI, and ICM are effective for clearing enemy positions, observers, and antennas off rooftops.

(h) Swirling winds may degrade smoke operations.

(i) Family of scatterable mines (FASCAM) may be used to impede enemy movements. FASCAM effectiveness is reduced when delivered on a hard surface.

(4) Targeting is difficult in urban terrain because the enemy has many covered and concealed positions and movement lanes. The enemy may be on rooftops and in buildings, and may use sewer and subway systems. Aerial observers are extremely valuable for targeting because they can see deep to detect movements, positions on rooftops, and fortifications. Targets should be planned on rooftops to clear away enemy FOs as well as communications and radar equipment. Targets should also be planned on major roads, at road intersections, and on known or likely enemy fortifications.

Employing artillery in the direct fire mode to destroy fortifications should be considered. Also, restrictive fire support coordination measures (such as a restrictive fire area or no-fire area) may be imposed to protect civilians and critical installations.

(5) The 155-mm and 8-inch self-propelled howitzers are effective in neutralizing concrete targets with direct fire. Concrete-piercing 155-mm and 8-inch rounds can penetrate 36 inches and 56 inches of concrete, respectively, at ranges up to 2,200 meters. These howitzers must be closely protected when used in the direct-fire mode since none of them have any significant protection for their crews. Restrictions may be placed on types of artillery ammunition used to reduce rubble on avenues of movement that may be used by friendly forces.

(6) Forward observers must be able to determine where and how large the dead space is. Dead space is the area in which indirect fires cannot reach the street level because of buildings. This area is a safe haven for the enemy because he is protected from indirect fires. For low-angle artillery, the dead space is about five times the height of the building. For mortars and high-angle artillery, the dead space is about one-half the height of the building.

(7) Aerial observers are effective for seeing behind buildings immediately to the front of friendly forces. They are extremely helpful when using the ladder method of adjustment because they may actually see the adjusting rounds impact behind buildings. Aerial observers can also relay calls for fire when communications are degraded due to power lines or building mask.

(8) Radar can locate many artillery and mortar targets in an urban environment because of the high percentage of high-angle fires. If radars are sited too close behind tall buildings, some effectiveness will be lost.

- b. The use of airburst fires is an effective means of clearing snipers from rooftops. HE shells with delay fuzes may be effective against enemy troops in the upper floors of buildings, but due to the overhead cover provided by the building, such shells have little effect on the enemy in the lower floors.
3. Naval Gunfire. When a unit is operating with gunfire support within range, naval gunfire can provide effective fire support. If naval gunfire is used, a supporting arms liaison team (SALT) of a US Marine air naval gunfire liaison company (ANGLICO) may be attached to the battalion. The SALT consists of one liaison section that operates at the battalion main CP. It also has two firepower control teams at the company level, providing ship-to-shore communications and coordination for naval gunfire support. The SALT collocates and coordinates all naval gunfire support with battalion FSE.
4. Tactical Air. A battalion may be supported by USAF, USN, USMC, or allied fighters and attack aircraft while fighting in built-up areas.
- a. The employment of close air support (CAS) depends on the following.
 - (1) Shock and concussion. Heavy air bombardment provides tactical advantages to an attacker. The shock and concussion of the bombardment reduce the efficiency of defending troops and destroy defensive positions.
 - (2) Rubble and debris. The rubble and debris resulting from air attacks may increase the defender's cover while creating major obstacles to the movement of attacking forces.
 - (3) Proximity of friendly troops. The proximity of opposing forces to friendly troops may require the use of precision-guided munitions and may require the temporary disengagement of friendly forces in contact. The AC-130 is the air weapons platform of choice for precision MOUT as the proximity of friendly troops precludes other tactical air use.
 - (4) Indigenous civilians or key facilities. The use of air weapons may be restricted by the presence of civilians or the requirement to preserve key facilities within a city.
 - (5) Limited ground observation. Limited ground observation may require the use of airborne FAC.
 - b. CAS may be employed during defensive operations:
 - (1) To strike enemy attack formations and concentrations outside the built-up area.
 - (2) To provide precision-guided munitions support to counterattacks for recovering fallen friendly strongpoints.
5. Air Defense. Basic air defense doctrine does not change when units operate in urbanized terrain. The fundamental principles of mix, mass, mobility, and integration all apply to the employment of air defense assets.
- a. The ground commander must consider the following when developing his defense plan.

- (1) Enemy air targets, such as principal lines of communications, road and rail networks, and bridges, are often found in and around built-up areas.
- (2) Good firing positions may be difficult to find and occupy for long-range air defense missile systems in the built-up areas. Therefore, the number of weapons the commander can employ may be limited.
- (3) Movement between positions is normally restricted in built-up areas.
- (4) Long-range systems can provide air defense cover from positions on or outside of the edge of the city.
- (5) Radar masking and degraded communications reduce air defense warning time for all units. Air defense control measures must be adjusted to permit responsive air defense within this reduced warning environment.

- b. Positioning of Vulcan weapons in built-up areas is often limited to more open areas without masking such as parks, fields, and rail yards. Towed Vulcans (separated from their prime movers) may be emplaced by helicopter onto rooftops in dense built-up areas to provide protection against air attacks from all directions. This should be accomplished only when justified by the expected length of occupation of the area and of the enemy air threat.
- c. Stingers provide protection for battalions the same as in any operation. When employed within the built-up area, rooftops normally offer the best firing positions.
- d. Heavy machine guns emplaced on rooftops can also provide additional air defense.

6. Army Aviation. Army aviation support of urban operations includes attack, observation, utility, and cargo helicopters for air movement or air assault operations, command and control, observation, reconnaissance, operations of sensory devices, attack, radio transmissions, and medical evacuation. When using Army aviation, the commander considers the enemy air situation, enemy air defenses, terrain in or adjacent to the city, and the availability of Army or Air Force suppression means. Missions for Army aviation during urban defensive operations include:

- a. Long-range anti-armor fire.
- b. Rapid insertion or relocation of personnel (anti-armor teams and reserves).
- c. Rapid concentration of forces and fires.
- d. Retrograde movement of friendly forces.
- e. Combat service support operations.
- f. Command and control.
- g. Communications.
- h. Intelligence gathering operations.

7. Helicopters. An advantage can be gained by air assaulting onto rooftops. Before a mission, an inspection should be made of rooftops to ensure that no obstacles exist, such as electrical wires,

telephone poles, antennas, or enemy-emplaced mines and wire, that could damage helicopters or troops. In many modern cities, office buildings often have helipads on their roofs, which are ideal for landing helicopters. Other buildings, such as parking garages, are usually strong enough to support the weight of a helicopter. The delivery of troops onto a building can also be accomplished by rappelling from the helicopter or jumping out of the helicopter while it hovers just above the roof.

- a. **Small-Scale Assaults.** Small units may have to be landed onto the rooftop of a key building. Success depends on minimum exposure and the suppression of all enemy positions that could fire on the helicopter. Depending on the construction of the roof, rappelling troops from the helicopter may be more of an advantage than landing them on the rooftop. The rappel is often more reliable and safer for the troops than a jump from a low hover. With practice, soldiers can accomplish a rappel insertion with a minimum of exposure.
- b. **Large-Scale Assaults.** For large-scale air assaults, rooftop landings are not practical. Therefore, open spaces (parks, parking lots, sports arenas) within the built-up area must be used. Several spaces large enough for helicopter operations normally can be found within 2 kilometers of a city's center.
- c. **Air Movement of Troops and Supplies.** In battle in a built-up area, heliborne troop movement may become a major requirement. Units engaged in house-to-house fighting normally suffer more casualties than units fighting in open terrain. The casualties must be evacuated and replaced quickly with new troops. At the same time, roads are likely to be crowded with resupply and evacuation vehicles, and also be blocked with craters or rubble. Helicopters provide a responsive means to move troops by flying nap-of-the-earth flight techniques down selected streets already secured and cleared of obstacles. Aircraft deliver the troops at the last covered position short of the fighting and then return without exposure to enemy direct fire. Similar flight techniques can be used for air movement of supplies and medical evacuation missions.
- d. **Air Assaults.** Air assaults into enemy-held territory are extremely difficult ([Figure 3-22](#)). One technique is to fly nap-of-the-earth down a broad street or commercial ribbon while attack helicopters and door gunners from utility helicopters suppress buildings on either side of the street. Scheduled artillery preparations can be incorporated into the air assault plan through the H-hour sequence. Feints and demonstrations in the form of false insertions can confuse the enemy as to the real assault landings.

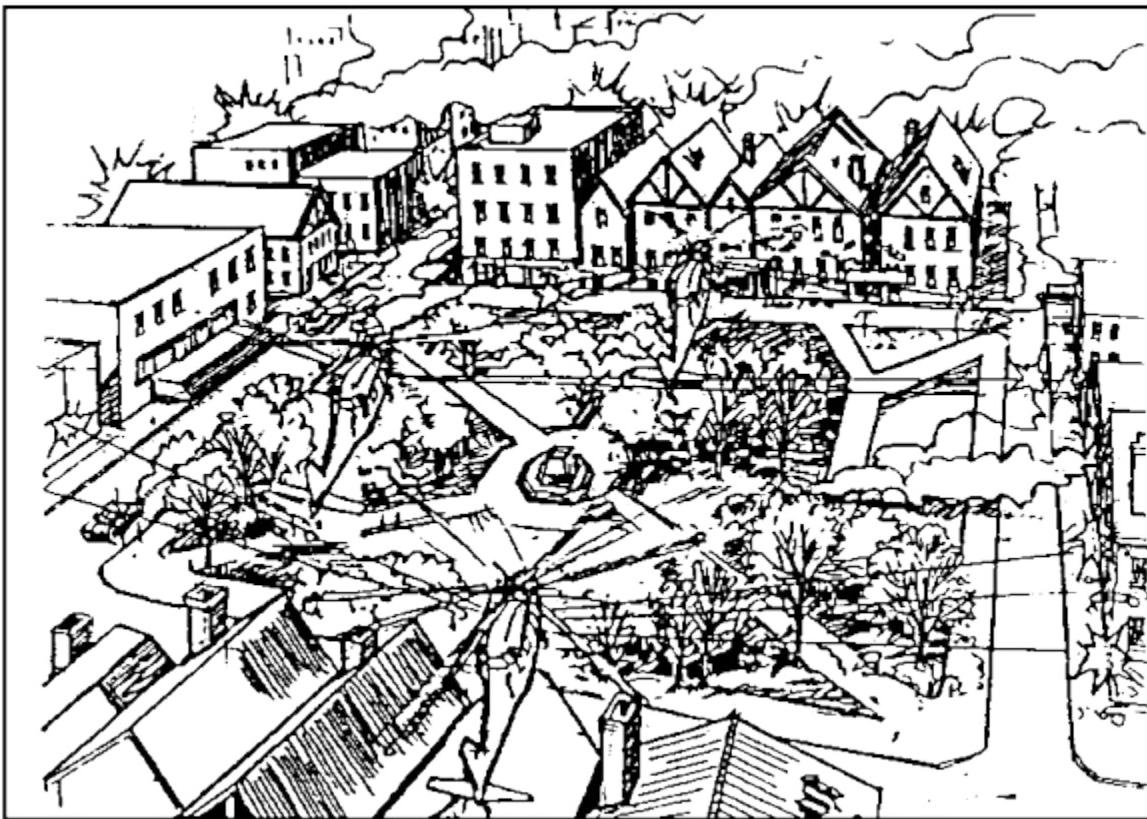


Figure 3-22. Air assault of a built-up area.

8. **Engineers.** The engineer terrain team supports the division commander and staff with specialized terrain analyses, products, and information for combat in built-up areas. During fighting in built-up areas, divisional engineers should be attached to the dispersed maneuver elements; for example, one engineer company to each committed brigade, one platoon to each battalion or battalion task force, and a squad to each company or company team. Most engineer manual-labor tasks, however, will have to be completed by infantry units, with reinforcing engineer heavy-equipment support and technical supervision.

a. **Defensive Mission.** Engineers may perform the following missions during the defense of a built-up area.

- (1) Construct complex obstacle systems.
- (2) Provide technical advice to maneuver commanders.
- (3) Rubble buildings.
- (4) Lay mines.
- (5) Assist in the preparation of defensive strongpoints.
- (6) Maintain counterattack, communications, and resupply routes.
- (7) Enhance movement between buildings, catwalks, bridges, and so on.
- (8) Fight as infantry, when needed.

b. Defense Against Armor. In defensive situations, when opposed by an armor-heavy enemy, priority should be given to the construction of anti-armor obstacles throughout the built-up area. Use of local materials, where possible, makes obstacle construction easier and reduces logistics requirements. Streets should be barricaded in front of defensive positions at the effective range of anti-armor weapons. These weapons are used to increase the destruction by anti-armor fires, to separate dismounted enemy infantry from their supporting tanks, and to assist in the delay and destruction of the attacker. Anti-armor mines with anti-handling devices, integrated with antipersonnel mines in and around obstacles and covered by fires, help stop an enemy attack.

9. Military Police. Military police (MP) operations play a significant role by assisting the tactical commander in meeting the challenges with combat in built-up areas. Through their four battlefield missions (battlefield circulation control, area security, EPW operations, and law and order) MP provide a wide range of diverse support in urban terrain. MP operations require continuous coordination-with host nation civilian police to maintain control of the civilian population and to enforce law and order.

a. MP units take measures to support area damage control operations that are frequently found in built-up areas. With the increased possibility of rubble, MP units report, block off affected areas, and reroute movement to alternate road networks.

b. MP units also secure critical activities, such as communications centers and water and electrical supply sources. They are responsible for securing critical cells within the corps and Theater Army Area Command (TAACOM) main CPs, which often use existing "hardstand" structures located in built-up areas.

c. MP units are tasked with EPW operations and collect them as far forward as possible. They operate collecting points and holding areas to briefly retain EPWs and civilian internees (CI). EPW operations are of great importance in built-up areas because the rate of capture can be higher than normal.

d. Commanders must realize that MP support may not be available and that infantry soldiers may have to assume certain MP missions. The following are some of those missions:

(1) Route reconnaissance, selection of routes and alternate routes, convoy escort, and security of lines of communication.

(2) Control of roads, waterways, and railroad terminals, which are critical chokepoints in the main supply routes.

(3) Security of critical sites and facilities to include communication centers, government buildings, water and electrical supply sources, C4 nodes, nuclear or chemical delivery means and storage facilities, and other mission essential areas.

(4) Refugee control in close cooperation with host nation civil authorities. ([FM 90-10-1](#), Chapter 7 for more information.)

(5) Collection and escort of EPWs.

10. Communications. Buildings and electrical power lines reduce the range of FM radios. To overcome this problem, battalions set up retransmission stations or radio relays, which are most effective when

placed in high areas. Antennas should be camouflaged by placing them near tall structures. Remoting radio sets or placing antennas on rooftops can also solve the range problem.

- a. **Wire.** Wire is a more secure and effective means of communications in built-up areas. Wire should be laid overhead on existing poles or underground to prevent vehicles from cutting them.
- b. **Messengers and Visual Signals.** Messengers and visual signals can also be used in built-up areas. Messengers must plan routes that avoid pockets of resistance. Routes and time schedules should be varied to avoid establishing a pattern. Visual signals must be planned so they can be seen from the buildings.
- c. **Sound.** Sound signals are normally not effective in built-up areas due to too much surrounding noise.
- d. **Existing Systems.** If existing civil or military communications facilities can be captured intact, they can also be used by the infantry battalion. A civilian phone system, for instance, can provide a reliable, secure means of communication if codes and authentication tables are used. Other civilian media can also be used to broadcast messages to the public.
 - (1) Evacuation notices, evacuation routes, and other emergency notices designed to warn or advise the civilian population must be coordinated through the civil affairs officer. Such notices should be issued by the local civil government through printed or electronic news media.
 - (2) Use of news media channels in the immediate area of combat operations for other than emergency communications must also be coordinated through the civil affairs officer. A record copy of such communications will be sent to the first public affairs office in the chain of command.

EMPLOYMENT AND EFFECTS OF WEAPONS

This section supplements the technical manuals and field manuals that describe weapons capabilities and effects against generic targets. It focuses on specific employment considerations pertaining to combat in built-up areas, and it addresses both organic infantry weapons and combat support weapons.

1. Effectiveness of Weapons and Demolitions. The characteristics and nature of combat in built-up areas affect the results and employment of weapons. Leaders at all levels must consider the following factors in various combinations when choosing their weapons.

- a. Hard, smooth, flat surfaces are characteristic of urban targets. Rarely do rounds impact perpendicular to these flat surfaces but at some angle of obliquity. This reduces the effect of a round and increases the threat of ricochets. The tendency of rounds to strike glancing blows against hard surfaces means that up to 25 percent of impact-fuzed explosive rounds may not detonate when fired onto rubbed areas.
- b. Engagement ranges are close. Studies and historical analyses have shown that only 5 percent of all targets are more than 100 meters away. About 90 percent of all targets are located 50 meters or less from the identifying soldier. Few personnel targets will be visible beyond 50

meters and usually occur at 35 meters or less. Minimum arming ranges and troop safety from backblast or fragmentation effects must be considered.

- c. Engagement times are short. Enemy personnel present only fleeting targets. Enemy-held buildings or structures are normally covered by fire and often cannot be engaged with deliberate, well-aimed shots.
- d. Depression and elevation limits for some weapons create dead space. Tall buildings form deep canyons that are often safe from indirect fires. Some weapons can fire rounds to ricochet behind cover and inflict casualties. Target engagement from oblique angles, both horizontal and vertical, demands superior marksmanship skills.
- e. Smoke from burning buildings, dust from explosions, shadows from tall buildings, and the lack of light penetrating inner rooms all combine to reduce visibility and to increase a sense of isolation. Added to this is the masking of fires caused by rubble and man-made structures. Targets, even those at close range, tend to be indistinct.
- f. Urban fighting often becomes confused melees with several small units attacking on converging axes. The risks from friendly fires, ricochets, and fratricide must be considered during the planning phase of operations and control measures continually adjusted to lower these risks. Soldiers and leaders must maintain a sense of situational awareness and clearly mark their progress in accordance with (IAW) unit SOP to avoid fratricide.
- g. Both the firer and target may be inside or outside buildings, or they may both be inside the same or separate buildings. The enclosed nature of combat in built-up areas means that the weapon's effect, such as muzzle blast and backblast, must be considered as well as the round's impact on the target.
- h. Usually the man-made structure must be attacked before enemy personnel inside are attacked. Therefore, weapons and demolitions can be chosen for employment based on their effects against masonry and concrete rather than against enemy personnel.
- i. Modern engineering and design improvements mean that most large buildings constructed since World War II are resilient to the blast effects of bomb and artillery attack. Even though modern buildings may burn easily, they often retain their structural integrity and remain standing. Once high-rise buildings burn out, they are still useful to the military and are almost impossible to damage further. A large structure can take 24 to 48 hours to burn out and get cool enough for soldiers to enter.
- j. The most common worldwide building type is the 12- to 24-inch brick building. [Table 3-1](#) lists the frequency of occurrence of building types worldwide.

TYPE OF BUILDING	FREQUENCY OF OCCURRENCE (Percentage)
30-inch Stone	1
8- to 10-inch Reinforced concrete	6.9
12-to 24-inch Brick	63
6-inch wood	16
14-inch steel and concrete (heavy clad)	2
7-inch steel and concrete (light clad)	12

Table 3-1. Types of buildings and frequency of occurrence.

2. M16 Rifle and M249 Squad Automatic Weapon/Machine Gun. The M16A1/M16A2 rifle is the most common weapon fired in built-up areas. The M16A1/M16A2 rifle and the M249 are used to kill enemy personnel, to suppress enemy fire and observation, and to penetrate light cover. Leaders can use 5.56-mm tracer fire to designate targets for other weapons.

a. **Employment.** Close combat is the predominant characteristic of urban engagements. Riflemen must be able to hit small, fleeting targets from bunker apertures, windows, and loopholes. This requires pinpoint accuracy with weapons fired in the semi-automatic mode. Killing an enemy through an 8-inch loophole at a range of 50 meters is a challenge, but one that may be common in combat in built-up areas.

(1) When fighting inside buildings, three-round bursts or rapid semiautomatic fire should be used. To suppress defenders while entering a room, a series of rapid three-round bursts should be fired at all identified targets and likely enemy positions. This is more effective than long bursts or spraying the room with automatic fire. Soldiers should fire from an underarm or shoulder position; not from the hip.

(2) When targets reveal themselves in buildings, the most effective engagement is the quick-fire technique with the weapon up and both eyes open. (See FM 23-9 for more detailed information on this technique.) Accurate quick fire not only kills enemy soldiers but also gives the attacker fire superiority.

(3) Within built-up areas, burning debris, reduced ambient light, strong shadow patterns of varying density, and smoke all limit the effect of night vision and sighting devices. The use of aiming stakes in the defense and of the pointing technique in the offense, both using three-round bursts, are night firing skills required of all infantrymen. The individual laser aiming light can sometimes be used effectively with night vision goggles. Any soldier using NVG should be teamed with at least one soldier not wearing them.

b. Weapon Penetration. The penetration that can be achieved with a 5.56-mm round depends on the range to the target and the type of material being fired against. The M16A2 and M249 achieve greater penetration than the older M16A1, but only at longer ranges. At close range, both weapons perform the same. Single 5.56-mm rounds are not effective against structural materials (as opposed to partitions) when fired at close range - the closer the range, the less the penetration.

- (1) For the 5.56-mm round, maximum penetration occurs at 200 meters. At ranges less than 25 meters, penetration is greatly reduced. At 10 meters, penetration by the M16 round is poor due to the tremendous stress placed on this high-speed round, which causes it to yaw upon striking a target. Stress causes the projectile to break up, and the resulting fragments are often too small to penetrate.
- (2) Even with reduced penetration at short ranges, interior walls made of thin wood paneling, sheetrock, or plaster are no protection against 5.56-mm rounds. Common office furniture such as desks and chairs cannot stop these rounds, but a layer of books 18 to 24 inches thick can.
- (3) Wooden frame buildings and single cinder block walls offer little protection from 5.56-mm rounds. When clearing such structures, soldiers must ensure that friendly casualties do not result from rounds passing through walls, floors, or ceilings.
- (4) Armor-piercing rounds are slightly more effective than ball ammunition in penetrating urban targets at all ranges. They are more likely to ricochet than ball ammunition, especially when the target presents a high degree of obliquity.

c. Protection. The following common barriers in built-up areas stop a 5.56-mm round fired at less than 50 meters:

- (1) One thickness of sandbags.
- (2) A 2-inch concrete wall (unreinforced).
- (3) A 55-gallon drum filled with water or sand.
- (4) A small ammunition can filled with sand.
- (5) A cinder block filled with sand (block will probably shatter).
- (6) A plate glass windowpane at a 45-degree angle (glass fragments will be thrown behind the glass).
- (7) A brick veneer.
- (8) A car body (an M16A1/M16A2 rifle penetrates but normally will not exit).

d. Wall Penetration. Although most structural materials repel single 5.56-mm rounds, continued and concentrated firing can breach some typical urban structures (see [table 3-2](#)).

TYPE	PENETRATION	ROUNDS (REQUIRED)
8-inch reinforced concrete	Initial loophole	35 250
14-inch triple brick	Initial loophole	90 160
12-inch cinder block with single-brick veneer	Loophole Breach hole	60 250
9-inch double brick	Initial Loophole	70 120
16-inch tree trunk or log wall	Initial*	1 to 3
12-inch cinder block (filled with sand)	Loophole	35
24-inch double sandbag wall	Initial*	220
3/8-inch mild steel door	Initial*	1

*Penetration only, no loophole.

Table 3-2. Structure penetration capabilities of the 5.56-mm round against typical urban targets (range 25 to 100 meters).

- (1) The best method for breaching a masonry wall is by firing short bursts (three to five rounds) in a U-shaped pattern. The distance from the gunner to the wall should be minimized for best results - ranges as close as 25 meters are relatively safe from ricochet. Ballistic eye protection, protective vest, and helmet should be worn.
- (2) Ball ammunition and armor-piercing rounds produce almost the same results, but armor-piercing rounds are more likely to fly back at the firer. The 5.56-mm round can be used to create either a loophole (about 7 inches in diameter) or a breach hole (large enough for a man to enter). When used against reinforced concrete, the M16 rifle and M249 cannot cut the reinforcing bars.

3. Medium and Heavy Machine Guns (7.62-mm and .50 caliber). In the urban environment, the Browning .50 caliber machine gun and the 7.62-mm M60 machine gun provide high-volume, long-range, automatic fires for the suppression or destruction of targets. They provide final protective fire along fixed lines and can be used to penetrate light structures - the .50 caliber machine gun is most effective in this role. Tracers from both machine guns are likely to start fires, but the .50 caliber tracer is more apt to do so.

- a. **Employment.** The primary consideration impacting on the employment of machine guns within built-up areas is the limited availability of long-range fields of fire. Although machine

guns should be emplaced at the lowest level possible, grazing fire at ground level is often obstructed by rubble.

- (1) The .50 caliber machine gun is often employed on its vehicular mount during both offensive and defensive operations. If necessary, it can be mounted on the M3 tripod mount for use in the ground role or in the upper level of buildings. When mounted on a tripod, the .50 caliber machine gun can be used as an accurate, long-range weapon and can supplement sniper fires.
- (2) The M60 machine gun is cumbersome, making it difficult to use inside while clearing a building. However, it is useful outside to suppress and isolate enemy defenders. The M60 can be fired from either the shoulder or the hip to provide a high volume of assault and suppressive fires. The use of the long sling to support the weapon and ammunition is preferred.
- (3) Because of their reduced penetration power, M60 machine guns are less effective against masonry targets than .50 caliber machine guns. However, their availability and light weight make them well suited to augment heavy machine gun fire or to be used in areas where .50 caliber machine guns cannot be positioned, or as a substitute when heavy machine guns are not available. The M60 machine gun can be employed on its tripod to deliver accurate fire along fixed lines and then can quickly be converted to bipod fire to cover alternate fields of fire.

b. **Weapon Penetration.** The ability of the 7.62-mm and .50 caliber rounds to penetrate are also affected by the range to the target and type of material fired against. The 7.62-mm round is affected less by close ranges than the 5.56-mm; the .50 caliber's penetration is reduced least of all.

- (1) At 50 meters, the 7.62-mm ball round cannot penetrate a single layer of sandbags. It can penetrate a single layer at 200 meters, but not a double layer. The armor-piercing round does only slightly better against sandbags. It cannot penetrate a double layer but can penetrate up to 10 inches at 600 meters.
- (2) The penetration of the 7.62-mm round is best at 600 meters but most urban targets are closer. The longest effective range is usually 200 meters or less. [Table 3-3](#) explains the penetration capabilities of a single 7.62-mm (ball) round at close ranges.

RANGE (meters)	PINE BOARD (inches)	DRY LOOSE SAND (inches)	CINDER BLOCK (inches)	CONCRETE (inches)
25	13	5	8	2
100	18	4.5	10	2
200	41	7	8	2

Table 3-3. Penetration capabilities of a single 7.62-mm (ball) round.

- (3) The .50 caliber round is also optimized for penetration at long ranges (about 800 meters). For hard targets, .50 caliber penetration is affected by obliquity and range. Both

armor-piercing and ball ammunition penetrate 14 inches of sand or 28 inches of packed earth at 200 meters, if the rounds impact perpendicular to the flat face of the target.

Table 3-4 explains the effect of a 25-degree obliquity on a .50 caliber penetration.

THICKNESS (meters)	100 METERS (rounds)	200 METERS (rounds)
2	300	1,200
3	450	1,800
4	600	2,400

Table 3-4. Number of rounds needed to penetrate a reinforced concrete wall at a 25-degree obliquity.

c. **Protection.** Barriers that offer protection against 5.56-mm rounds are also effective against 7.62-mm rounds with some exceptions. The 7.62-mm round can penetrate a windowpane at a 45-degree obliquity, a hollow cinder block, or both sides of a car body. It can also easily penetrate wooden frame buildings. The .50 caliber round can penetrate all of the commonly found urban barriers except a sand-filled 55 gallon drum.

d. **Wall Penetration.** Continued and concentrated machine gun fire can breach most typical urban walls. Such fire cannot breach thick reinforced concrete structures or dense stone walls. Internal walls, partitions, plaster, floors, ceilings, common office furniture, home appliances, and bedding can be easily penetrated by both 7.62-mm and .50 caliber rounds (Table 3-5 and 3-6).

TYPE	THICKNESS (inches)	HOLE DIAMETER (inches)	ROUNDS REQUIRED
Reinforced concrete	8	7	100
Triple brick wall	14	7	170
Concrete block with single brick veneer	12	6 and 24	30 and 200
Cinder block (filled)	12	*	18
Double brick wall	9	*	45
Double sandbag wall	24	*	110
Log wall	16	*	1
Mild steel door	3/8	*	1

*Penetration only, no loophole.

Table 3-5. Structure penetrating capabilities of 7.62-mm round (NATO ball) against typical urban targets (range 25 meters).

(1) The M60 machine gun can be hard to hold steady to repeatedly hit the same point on a wall. The dust created by the bullet strikes also makes precise aiming difficult. Firing

from a tripod is usually more effective than without, especially if sandbags are used to steady the weapon. Short bursts of three to five rounds fired in a U-type pattern are best.

(2) Breaching a brick veneer presents a special problem for the M60 machine gun. Rounds penetrate the cinder block but leave a net-like structure of unbroken block. Excessive ammunition is required to destroy a net since most rounds only pass through a previously eroded hole. One or two minutes work with an E-tool, crowbar, or axe can remove this web and allow entry through the breach hole.

(3) The .50 caliber machine gun can be fired accurately from the tripod using the single-shot mode. This is the most efficient method for producing a loop hole. Automatic fire in three-to five-round bursts, in a U-type pattern, is more effective in producing a breach.

TYPE	THICKNESS (inches)	HOLE DIAMETER (inches)	ROUNDS REQUIRED
Reinforced concrete	10	12	50
	18	24 7	100 140
Triple brick wall	12	8 26	15 50
Concrete block with single brick veneer	12	10 33	25 45
Armor plate	1	*	1
Double sandbag wall	24	*	5
Log wall	16	*	1

*Penetration only, no loophole.

Table 3-6. Structure penetrating capabilities of .50 caliber ball against typical urban targets (range 35 meters).

4. Grenade Launchers. 40-mm (M203 and MK 19). Both the M203 dual-purpose weapon and the MK 19 grenade machine gun fire 40-mm HE and HEDP ammunition. Ammunition for these weapons is not interchangeable, but the grenade and fuze assembly that actually hits the target are identical. Both weapons provide point and area destructive fires as well as suppression. The MK 19 has a much higher rate of fire and a longer range; the M203 is much lighter and more maneuverable.

a. **Employment**. The main consideration affecting the employment of 40-mm grenades within built-up areas is the typically short engagement range. The 40-mm grenade has a minimum arming range of 14 to 28 meters. If the round strikes an object before it is armed, it will not detonate. Both the HE and HEDP rounds have 5-meter burst radii against exposed troops, which means that the minimum safe firing range for combat is 31 meters. The 40-mm grenades can be used to suppress the enemy in a building, or inflict casualties by firing through apertures or windows. The MK 19 can use its high rate of fire to concentrate rounds against light structures. This concentrated fire can create extensive damage. The 40-mm HEDP round can penetrate the armor on the flank, rear, and top of (former) Soviet-made BMPs and BTRs. Troops can use the

M203 from upper stories to deliver accurate fire against the top decks of armored vehicles. Multiple hits are normally required to achieve a kill.

b. **Weapon Penetration.** The 40-mm HEDP grenade has a small shaped charge that penetrates better than the HE round. It also has a thin wire wrapping that bursts into a dense fragmentation pattern, creating casualties out to 5 meters. Because they explode on contact, 40-mm rounds achieve the same penetration regardless of range. [Table 3-7](#) explains the penetration capabilities of the HEDP round.

TARGET	PENETRATION (inches)
Sandbags	20 (double layer)
Sand-filled cinder block	16
Pine logs	12
Armor plate	2

Table 3-7. Penetration capabilities of the HEDP round.

(1) If projected into an interior room, the 40-mm HEDP can penetrate all partition-type walls. It splinters plywood and plaster walls, making a hole large enough to fire a rifle through. It is better to have HEDP rounds pass into a room and explode on a far wall, even though much of the round's energy is wasted penetrating the back wall (see [Figure 3-23](#)). The fragmentation produced in the room causes more casualties than the high-explosive jet formed by the shaped charge.

(2) The fragments from the HEDP round do not reliably penetrate interior walls. They are also stopped by office furniture, sandbags, helmets, and protective vests (flak jackets). The M203 dual-purpose weapon has the inherent accuracy to place grenades into windows at 125 meters and bunker apertures at 50 meters. These ranges are significantly reduced as the angle of obliquity increases. Combat experience shows that M203 gunners cannot consistently hit windows at 50 meters when forced to aim and fire quickly.

c. **Wall Penetration.** The M203 cannot reasonably deliver the rounds needed to breach a typical exterior wall. The MK 19 can concentrate its fire and achieve wall penetration. Firing from a tripod, using a locked down traversing and elevating mechanism, is best for this role. Brick, cinder block, and concrete can be breached using the MK 19; individual HEDP rounds can penetrate 6 to 8 inches of brick. The only material that has proven resistant to concentrated 40-mm fire is dense stone such as that used in some European building construction. No precise data exist as to the number of rounds required to produce loopholes or breach holes with the MK 19. However, the round's explosive effects are dramatic and should exceed the performance of the .50 caliber machine gun.

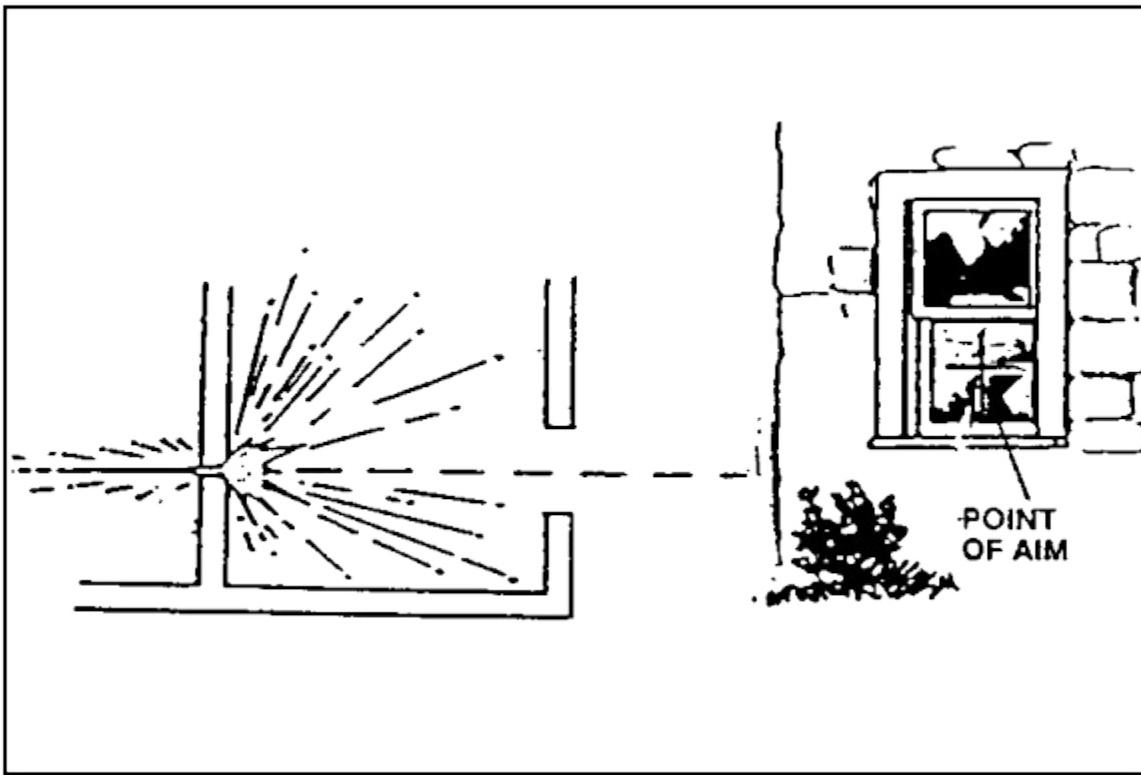


Figure 3-23. Aim point for 40-mm HEDP.

5. Light and Medium Recoilless Weapons. Light and medium recoilless weapons are used to attack enemy personnel, field fortifications, and light armored vehicles. They have limited capability against main battle tanks, especially those equipped with reactive armor, except when attacking from the top, flanks, or rear. This category of weapons includes the M72 LAW; the AT4 or AT8; the M47 Dragon; the 90-mm and 84-mm recoilless rifles; the shoulder-launched, multipurpose, assault weapon (SMAW); and available foreign weapons such as the RPG-7.

a. **Employment**. Other than defeating light armored vehicles, the most common task for which light recoilless weapons are used is to neutralize fortified firing positions. Due to the design of the warhead and the narrow blast effect, these weapons are not as effective in this role as heavier weapons such as a tank main gun round. Their light weight allows soldiers to carry several LAWs or AT4s. Light recoilless weapons can be fired from the tops of buildings or from areas with extensive ventilation.

(1) Light and medium recoilless weapons, with the exception of the SMAW and AT8, employ shaped-charge warheads. As a result, the hole they punch in walls is often too small to use as a loophole. The fragmentation and spall these weapons produce are limited. Normally, shaped-charge warheads do not neutralize enemy soldiers behind walls unless they are located directly in line with the point of impact.

(2) Against structures, shaped-charge weapons should be aimed about 6 inches below or to the side of a firing aperture (see [Figure 3-24](#)). This enhances the probability of killing the enemy behind the wall. A round that passes through a window wastes much of its energy on the back wall. Since these shaped-charge rounds lack the wire wrapping of the

40-mm HEDP, they burst into few fragments and are often ineffective casualty producers.

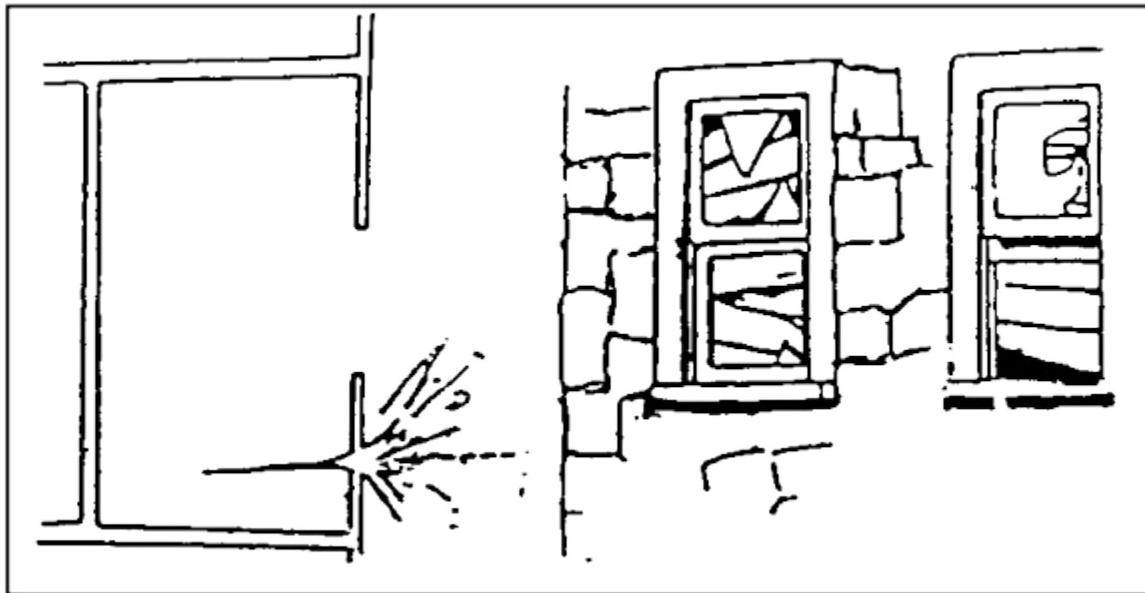


Figure 3-24. Point of aim for a shaped-charge weapon against a masonry structure.

(3) Sandbagged emplacements present a different problem (see [Figure 3-25](#)). Because sandbags absorb much of the energy from a shaped-charge, the rounds should be aimed at the center of the firing aperture. Even if the round misses the aperture, the bunker wall area near it is usually easiest to penetrate.

(4) Light and medium recoilless weapons obtain their most effective short-range anti-armor shots by firing from upper stories, or from the flanks and rear. When firing at main battle tanks, these weapons should always be employed against these weaker areas in volley or paired firing. They normally require multiple hits to achieve a kill on a tank. Flanks, top, and rear shots hit the most vulnerable parts of armored vehicles. Firing from upper stories protects the firer from tank main gun and coaxial machine gun fire since tanks cannot sharply elevate their cannons. The BMP-2 can elevate its 30-mm cannon to engage targets in upper stories. The BTR-series armored vehicles can also fire into upper stories with their heavy machine gun.

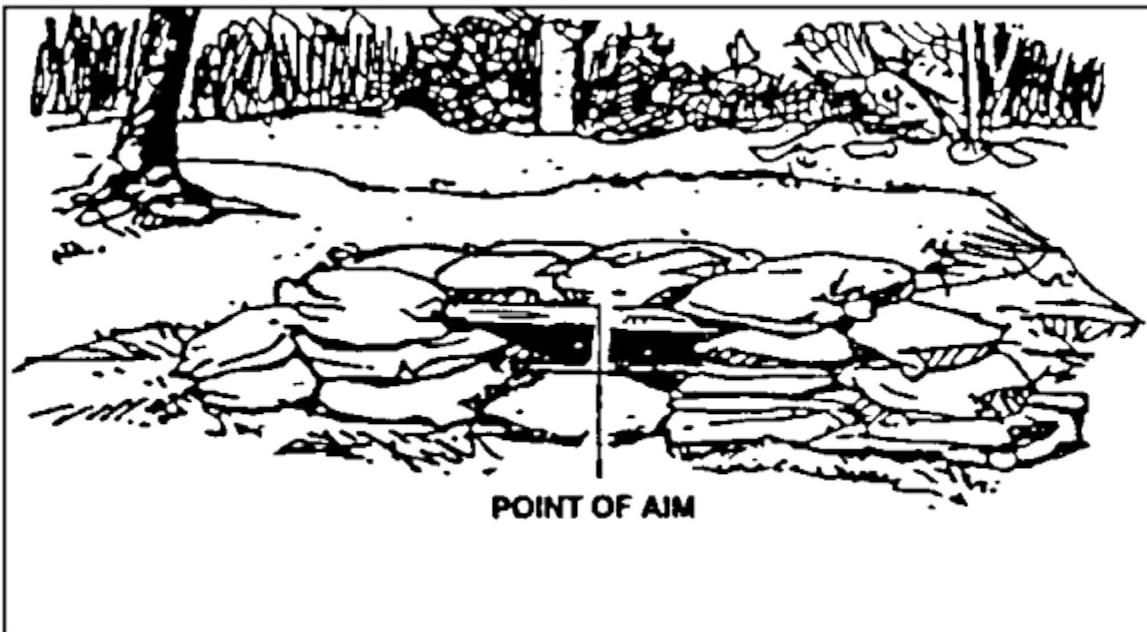


Figure 3-25. Point of aim for sandbagged emplacement.

(5) Modern infantry fighting vehicles, such as the BMP-2 and the BTR-80, have significantly improved frontal protection against shaped-charge weapons. Many main battle tanks have some form of reactive armor in addition to their thick armor plate. Head-on, ground-level shots against these vehicles have little probability of obtaining a kill. Even without reactive armor, modern main battle tanks are hard to destroy with a light anti-armor weapon.

(6) The easiest technique to use that will improve the probability of hitting and killing an armored vehicle is to increase the firing depression angle. A 45-degree downward firing angle doubles the probability of a first-round hit as compared to a ground-level shot (see [Figure 3-26](#)).

b. **Backblast.** Backblast characteristics must be considered when employing all recoilless weapons. During combat in built-up areas, the backblast area in the open is more hazardous due to all the loose rubble, and the channeling effect of the narrow streets and alleys. [Figure 3-27](#) shows the backblast area of United States light and medium recoilless weapons in the open.

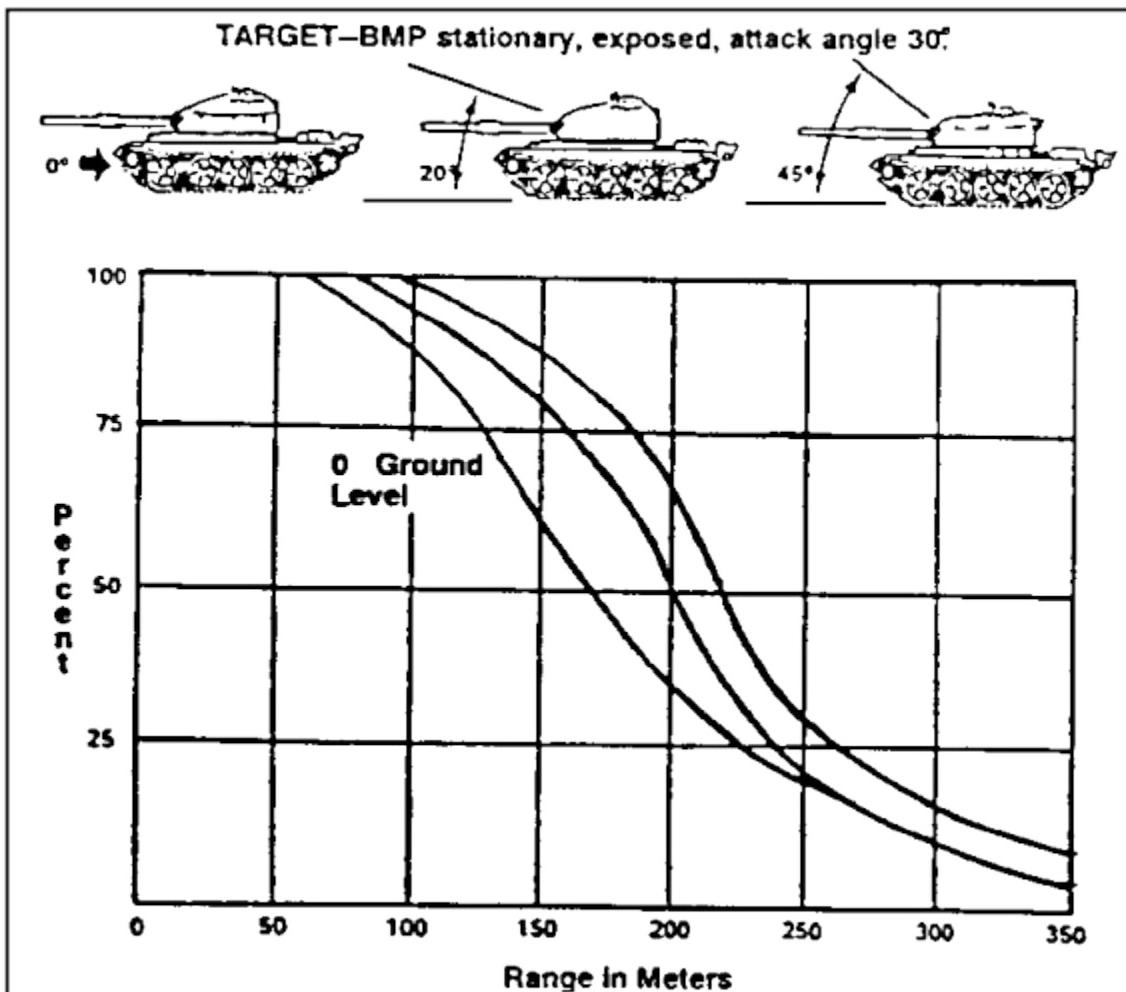


Figure 3-26. Probability of achieving a hit at different angles using an M72A2 LAW.

- (1) When firing recoilless weapons in the open, soldiers should protect themselves from blast and burn injuries caused by the backblast. All personnel should be out of the danger zone. Anyone not able to vacate the caution zone should be behind cover. Soldiers in the caution zone should wear helmets, protective vests, and eye protection. The firer and all soldiers in the area should wear earplugs.
- (2) Since the end of World War II, the US Army has conducted extensive testing on the effects of firing recoilless weapons from within enclosures. Beginning as early as 1948, tests have been conducted on every type of recoilless weapon available. In 1975, the US Army Human Engineering Laboratory at Aberdeen Proving Grounds, Maryland, conducted extensive firing of LAW, Dragon, 90-mm RCLR, and TOW from masonry and frame buildings, and from sandbag bunkers. These tests showed that firing these weapons from enclosures presented no serious hazards, even when the overpressure was enough to produce structural damage to the building. The following were other findings of this test.

Figure 3-27. Backblast areas of light recoilless weapons in the open.

- (a) Little hazard exists to the gunner or crew from any type of flying debris. Loose items were not hurled around the room.
 - (b) No substantial degradation occurs to the operator's tracking performance as a result of obscuration or blast overpressure.
 - (c) The most serious hazard that can be expected is hearing loss. This must be evaluated against the advantage gained in combat from firing from cover. To place this hazard in perspective, a gunner wearing earplugs and firing the loudest combination (the Dragon from within a masonry building) is exposed to less noise hazard than if he fired a LAW in the open without earplugs.
 - (d) The safest place for other soldiers in the room with the firer is against the wall from which the weapon is fired. Plastic ignition plugs are a hazard to anyone standing directly behind a LAW or TOW when it is fired.
 - (e) Firers should take advantage of all available sources of ventilation by opening doors and windows. Ventilation does not reduce the noise hazard, but it helps clear the room of smoke and dust, and reduces the effective duration of the overpressure.
 - (f) The only difference between firing these weapons from enclosures and firing them in the open is the duration of the pressure fluctuation.
 - (g) Frame buildings, especially small ones, can suffer structural damage to the rear walls, windows, and doors. Large rooms suffer slight damage, if any.
- (3) Recoilless weapons fired from within enclosures create some obscuration inside the room, but almost none from the gunner's position looking out. Inside the room, obscuration can be intense, but the room remains inhabitable. [Table 3-8](#) shows the effects of smoke and obscuration.

BUILDING	WEAPON	FROM GUNNER'S POSITION LOOKING OUT	INSIDE THE ROOM	FROM OUTSIDE AT A DISTANCE
Masonry	LAW Dragon	None Slight	Moderate Moderate	Slight smoke Small flash
Bunker	Dragon TOW	None None	Slight Slight	Moderate flash Moderate smoke
Small frame	LAW Dragon	None None	Moderate Severe	Moderate Moderate
Medium frame	LAW Dragon	None None	Slight Severe	Moderate Slight flash
Large frame	LAW Dragon TOW	None Slight None	Slight Severe Severe	None Slight flash Slight smoke

Table 3-8. Smoke and obscuration.

(4) The Dragon causes the most structural damage but only in frame buildings. There does not seem to be any threat of injury to the gunner, since the damage is usually to the walls away from the gunner. The most damage and debris is from flying plaster chips and pieces of wood trim. Large chunks of plasterboard can be dislodged from ceilings. The backblast from LAW, Dragon, or TOW rarely displaces furniture. [Table 3-9](#) shows the test results of structural damage and debris.

BUILDING	WEAPON	DAMAGE		DEBRIS MOVEMENT
		STRUCTURE	WALL COVERING	
Masonry	LAW Dragon	None None	Slight Slight	Slight Slight
Bunker	Dragon TOW	None None	None None	None Leaves and dust disturbed
Small frame	LAW Dragon	None Severe	Slight Severe	None None
Medium frame	LAW Dragon	None Slight	None Slight	Slight Lamp and chair overturned
Large frame	LAW Dragon TOW	None Slight Slight	Slight Moderate Severe	Slight None None

Table 3-9. Structural damage and debris movement.

(5) To fire a LAW from inside a room, the following safety precautions must be taken (see [Figure 3-28](#)).



Figure 3-28. Firing a LAW from inside a room.

- (a) At least 4 feet of clearance should exist between the rear of the LAW and the nearest wall.
 - (b) At least 20 square feet of ventilation (an open 7- by 3-feet door is sufficient) should exist to reduce or prevent structural damage to the building - the more ventilation, the better.
 - (c) All glass should be removed from windows.
 - (d) All personnel in the room should be forward of the rear of the weapon and should wear helmets, protective vests, ballistic eye protection, and earplugs.
 - (e) All combustible material should be removed from the rear of the weapon.
 - (f) Ceiling height should be at least 7 feet.
- (6) To fire a 90-mm RCLR or AT8, or SMAW from inside a room, the following safety precautions must be taken (see [Figure 3-29](#)).



Figure 3-29. Firing a 90-mm RCLR, AT4, AT8 or SMAW from inside a building.

- (a) The building should be of a sturdy construction.
- (b) The ceiling should be at least 7 feet high with loose plaster or ceiling boards removed.
- (c) The floor size should be at least 15 feet by 12 feet. (The larger the room, the better.)
- (d) At least 20 square feet of ventilation (room openings) should exist to the rear or side of the weapon. An open 7- by 3-foot door would provide minimum ventilation.
- (e) All glass should be removed from windows and small, loose objects removed from the room.
- (f) Floors should be wet to prevent dust and dirt from blowing around and obscuring the gunner's vision.
- (g) All personnel in the room should be forward of the rear of the weapon.
- (h) All personnel in the room should wear helmets, protective vests, ballistic eye protection, and earplugs.
- (i) If the gunner is firing from the prone position, his lower body must be perpendicular to the bore of the weapon or the blast could cause injury to his legs.

c. **Weapon Penetration.** The most important tasks to be performed against structures are the neutralization of fortified firing positions, personnel, and weapons behind barriers. Recoilless weapons can be used in this role; none, however, is as effective as heavy direct-fire weapons or standard demolitions. Each recoilless weapon has different penetrating ability against various targets. Penetration does not always mean the destruction of the integrity of a position. Usually, only those enemy soldiers directly in the path of the spall from a HEAT round become casualties. Other soldiers inside a fortification could be deafened, dazed, or shocked but eventually return to action.

(1) M72 LAW. The LAW, although light and easy to use, has a small explosive charge and limited penetration. It can be defeated by a double-layer brick wall backed by 4 feet of sandbags since it cannot produce a loophole in this type construction. The LAW requires at least 10 meters to arm. If it hits a target before it arms, it usually does not detonate. (The LAW is being replaced by the AT4 in the US Army inventory of munitions.) The LAW can penetrate:

- (a) 2 feet of reinforced concrete, leaving a dime-sized hole and creating little spall.
- (b) 6 feet of earth, leaving a quarter-sized hole with no spall.
- (c) 12 inches of steel (flanks, rear, and top armor of most armored vehicles), leaving a dime-sized hole.

(2) M136 84-mm Launcher (AT4). The AT4 is heavier than the LAW with a diameter of 84 millimeters, which gives the warhead much greater penetration. The AT4 can penetrate more than 17.5 inches (450 mm) of armor plate. Its warhead produces highly destructive results behind the armor. Tests against typical urban targets are still ongoing, but the AT4 should penetrate at least as well as the 90-mm recoilless rifle if not better. The AT4 has a minimum arming distance of 10 meters, which allows it to be fired successfully against close targets. Firers should be well covered by protective equipment when firing at close targets.

(3) 84-mm Launcher (AT8). The AT8 is a lightweight disposable, multipurpose, direct fire weapon designed especially for MOUT. Externally, the AT8 is almost identical to the AT4, and it is fired in the same manner. The AT8 was procured in limited amounts and issued to selected US Army and USMC units during the Persian Gulf War. Its fuze has the ability to distinguish between armor and soft earth, maximizing its capabilities against buildings, bunkers, or light armor. The warhead detonates immediately against hard targets, but delays detonation against soft targets and burrows in to explode inside. The AT8 destroys earth and timber bunkers, blows large holes in light-armored vehicles, and breaches 8-inch reinforced concrete walls and 12-inch triple brick walls.

(4) Recoilless rifles. The 90-mm recoilless rifle is being phased out of the US Army inventory of weapons, but it is still used in engineer battalions. The 84-mm Ranger anti-armor weapon system (RAAWS) is issued to some light forces. The recoilless rifles'

light weight and maneuverability, combined with great penetrating power, make them useful weapons during combat in built-up areas.

(a) The 90-mm RCLR has an antipersonnel round that is effective against exposed enemy. The flechette projectiles fired by this antipersonnel round cannot penetrate structural walls but can pierce partitions and wooden-framed buildings. The antipersonnel round has no minimum range, but the HEAT round is not armed until it has traveled 35 to 50 feet. The 90-mm HEAT round can penetrate:

- 3 1/2 feet of packed earth, leaving a 2-inch hole with no spall.
- 2 1/2 feet of reinforced concrete, creating a small loophole (less than 3 inches wide) with little spall.
- 10 inches of armor plate, leaving a quarter-sized hole.

(b) The RAAWS has a HEAT round for use against armored targets and an HE and HEDP round for use against other targets. The HE round can be set for either air burst or impact burst. It contains 800 steel balls that are distributed in a lethal pattern upon detonation. The HE round is effective against troops in the open or behind vertical cover such as a low wall. The HEDP round is probably the most useful during MOUT. It is effective against light-armored vehicles, thick concrete and brick walls, thin wood walls and field fortifications, and also unprotected troops. The RAAWS also fires illumination and smoke rounds. The smoke round is useful to cover friendly units as they cross small open areas. The HEAT round arms at 5 to 8 meters and may throw fragments back as far as 50 meters. The HE round arms at 20 to 70 meters and may throw its steel balls back as far as 250 meters. The HEDP round arms at 15 to 40 meters and produces only slight fragmentation out to 50 meters.

(5) Shoulder-launched, multipurpose, assault weapon (SMAW). The SMAW is being issued to US Marine Corps units. It has been type-classified and in time of war Army units could find it available. The SMAW is a lightweight, man-portable, assault weapon that is easily carried and placed into action by one man. It is used against fortified positions, but it is also effective against light-armored vehicles. The SMAW has a 9-mm spotting rifle and a 3.8-power telescope, which ensure accuracy over ranges common to combat in built-up areas. The SMAW has excellent incapacitating effects behind walls and inside bunkers, and can arm within 10 meters. It fires the same dual-mode fuzed round as the AT8, and it has another round designed for even greater effect against armored vehicles. The SMAW has the same penetration ability as the AT8 - it can destroy most bunkers with a single hit. Multiple shots can create breach holes even in reinforced concrete.

(6) RPG-7. The RPG-7 is a common threat weapon worldwide. It is lightweight and maneuverable, and is accurate over ranges common to combat in built-up areas. In a conflict almost anywhere in the world, US forces must protect themselves against RPGs.

The RPG warhead is moderately effective against armored vehicles particularly M113 armored personnel carriers. It is less effective against common urban hard targets. It has a limited effect against reinforced concrete or stone. Typically, the round produces a small hole with little spall. The RPG produces a small hole in earth berms with little blast effect and no spall. A triple layer of sandbags is usually protection against RPG rounds. Because of its fuze design, the RPG can often be defeated by a chain-link fence erected about 4 meters in front of a position. Even without such a barrier, a high percentage of RPG rounds fired against urban targets are duds due to glancing blows.

d. **Wall Breaching.** Wall breaching is a common combat task in built-up areas for which light recoilless weapons can be used. Breaching operations improve mobility by providing access to building interiors without using existing doors or windows. Breaching techniques can also be used to create loopholes for weapons positions or to allow hand grenades to be thrown into defended structures. Breach holes for troop mobility should be about 24 inches (60 centimeters) in diameter, Loopholes should be about 8 inches (20 centimeters) in diameter (see [Figure 3-30](#)). None of the light recoilless weapons organic to maneuver battalions (with the possible exception of the AT8 and SMAW) provide a one-shot wall-breaching ability. To breach walls, a number of shots should be planned.

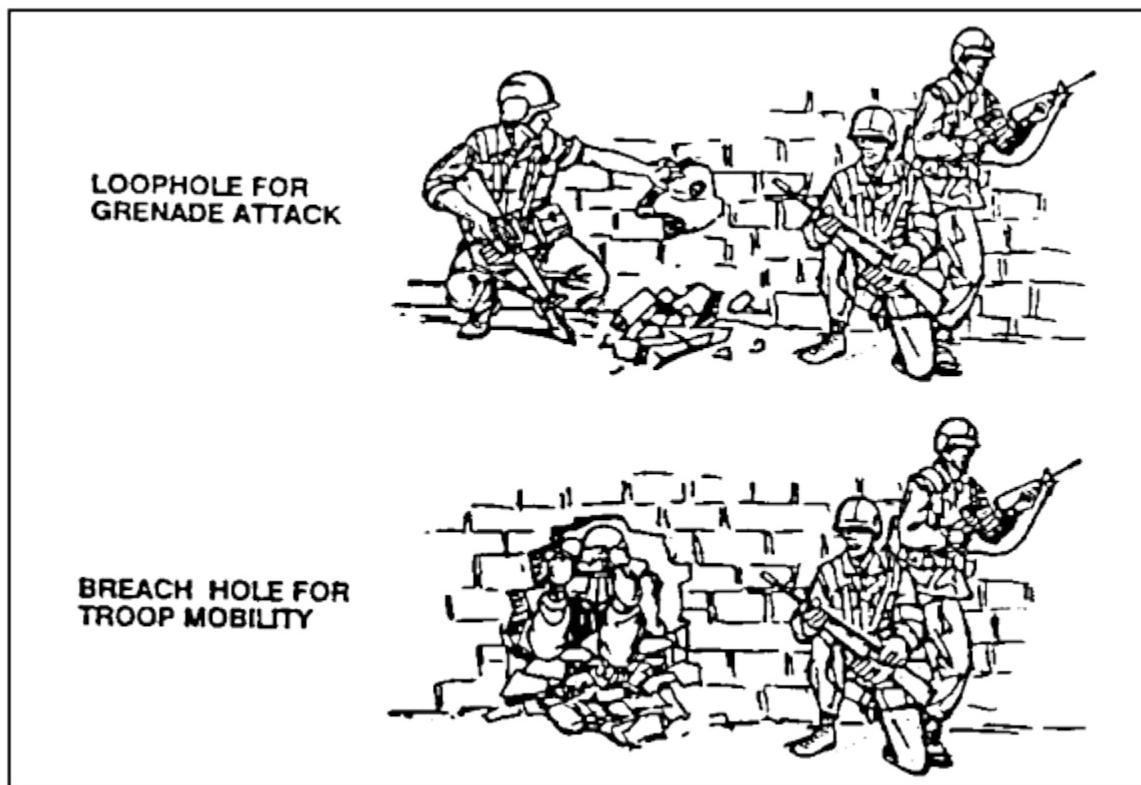


Figure 3-30. Tactical use of holes in masonry walls.

- (1) Of all the common building materials, heavy stone is the most difficult to penetrate. The LAW, AT4 or AT8, 90-mm RCLR, and RPG-7 usually will not penetrate a heavy European-style wall. Surface cratering is usually the only effect.

(2) Layered brick walls are also difficult to breach with light recoilless weapons. Some brick walls can be penetrated by multiple firings, especially if they are less than three bricks thick. Five LAW rounds fired at the same spot on a 8-inch (double-brick) wall normally produces a loophole. Heavier weapons, such as the AT4 and 90-mm RCLR, may require fewer rounds. The AT8 and SMAW produce a hole in brick walls that is often large enough to be a breach hole.

(3) Wooden structural walls offer little resistance to light recoilless weapons. Even heavy timbered walls are penetrated and splintered. Three LAW rounds fired at the same area of a wood-frame wall usually produce a man-sized hole. The AT8 and SMAW have a devastating effect against a wood-frame wall. A single round produces a breach hole as well as significant spall.

(4) Because of its high velocity, the AT4 may penetrate a soft target, such as a car body or frame building, before exploding.

(5) None of the light recoilless weapons are as effective against structural walls as demolitions or heavier weapons such as tank main gun, field artillery, or combat engineer vehicle demolition guns. Of all the light recoilless weapons, the SMAW and AT8 are the most effective.

6. **Antitank Guided Missiles**. Antitank guided missiles (ATGMs) are used mainly to defeat main battle tanks and other armored combat vehicles. They have a moderate capability against bunkers, buildings, and other fortified targets commonly found during combat in built-up areas. This category of weapons includes the TOW and Dragon missiles.

a. **Employment**. TOWs and Dragons provide overwatch antitank fires during the attack of a built-up area and an extended range capability for the engagement of armor during the defense. Within built-up areas, they are best employed along major thoroughfares and from the upper stories of buildings to attain long-range fields of fire. Their minimum firing range of 65 meters could limit firing opportunities in the confines of densely built-up areas.

(1) **Obstacles**. When fired from street level, rubble or other obstacles could interfere with missile flight. At least 3.5 feet (1 meter) of vertical clearance over such obstacles must be maintained. [Figure 3-31](#) shows the most common obstacles to ATGM flights found in built-up areas. Power lines are a special obstacle that present a unique threat to ATGM gunners. If the power in the lines has not been interrupted, the ATGM guidance wires could create a short circuit. This would allow extremely high voltage to pass to the gunner in the brief period before the guidance wires melted. This voltage could either damage the sight and guidance system, or injure the gunner. Before any ATGM is fired over a power line, an attempt must be made to determine whether or not the power has been interrupted.

(2) **Dead space**. Three aspects of dead space that affect ATGM fires are arming distance, maximum depression, and maximum elevation.

(a) Both the Dragon and TOW missiles have a minimum arming distance of 65 meters, which severely limits their use in built-up areas. Few areas in the inner city permit fires much beyond the minimum arming distance - ground-level long-range fires down streets or rail lines and across parks or plazas are possible. ATGMs may be used effectively from upper stories or roofs of buildings to fire into other buildings.

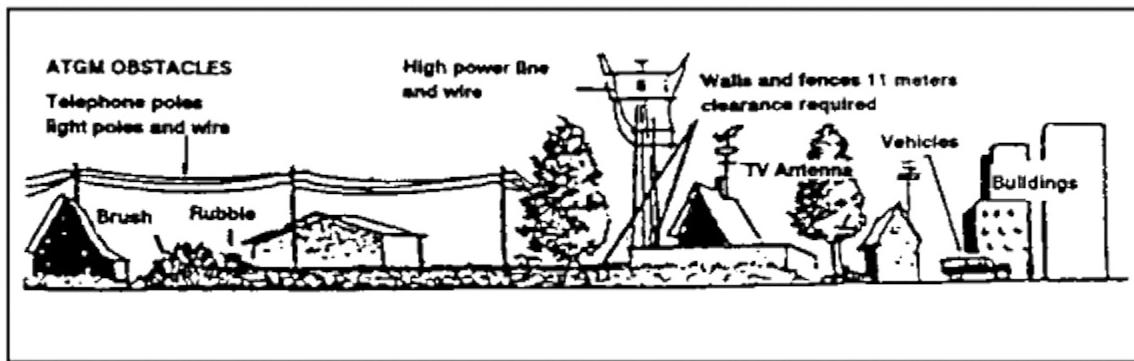


Figure 3-31. Common obstacles to ATGM flights.

Figure 3-31. Common obstacles to ATGM flights.

(b) The TOW is limited much more than the Dragon by its maximum depression and elevation. The maximum depression and elevation limits of the TOW mount could result in dead space and preclude the engagements of close targets (see [Figure 3-32](#)). A target located at the minimum arming range (65 meters) cannot be engaged by a TOW crew located any higher than the sixth floor of a building due to maximum depression limits. At 100 meters the TOW crew can be located as high as the ninth floor and still engage the target.

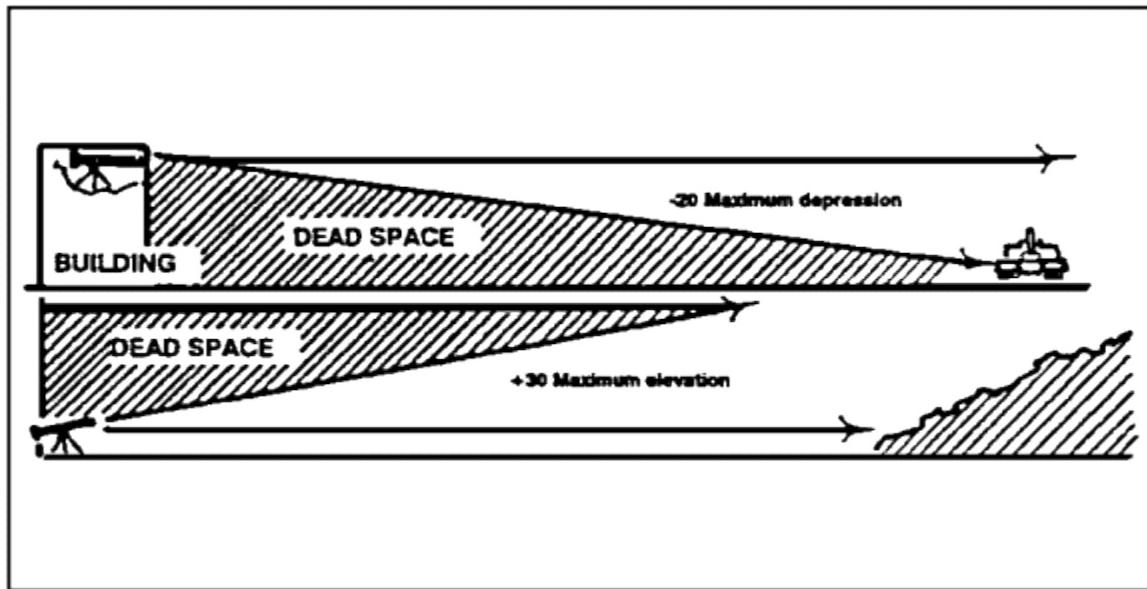


Figure 3-32. TOW maximum elevation and depression limitations.

(3) Backblast. As for the light recoilless weapons, backblast for ATGMs is more of a concern during combat in built-up areas than in open country. Any loose rubble in the caution zone could be picked up and thrown by the backblast. The channelling effect of walls and narrow streets is even more pronounced due to the greater backblast. If the ATGM backblast strikes a wall at an angle, it can pick up debris, or be deflected and cause injury to unprotected personnel ([Figure 3-33](#)). Both ATGMs can be fired from inside some buildings. In addition to the helmet and protective vest, eye protection and earplugs should be worn by all personnel in the room.

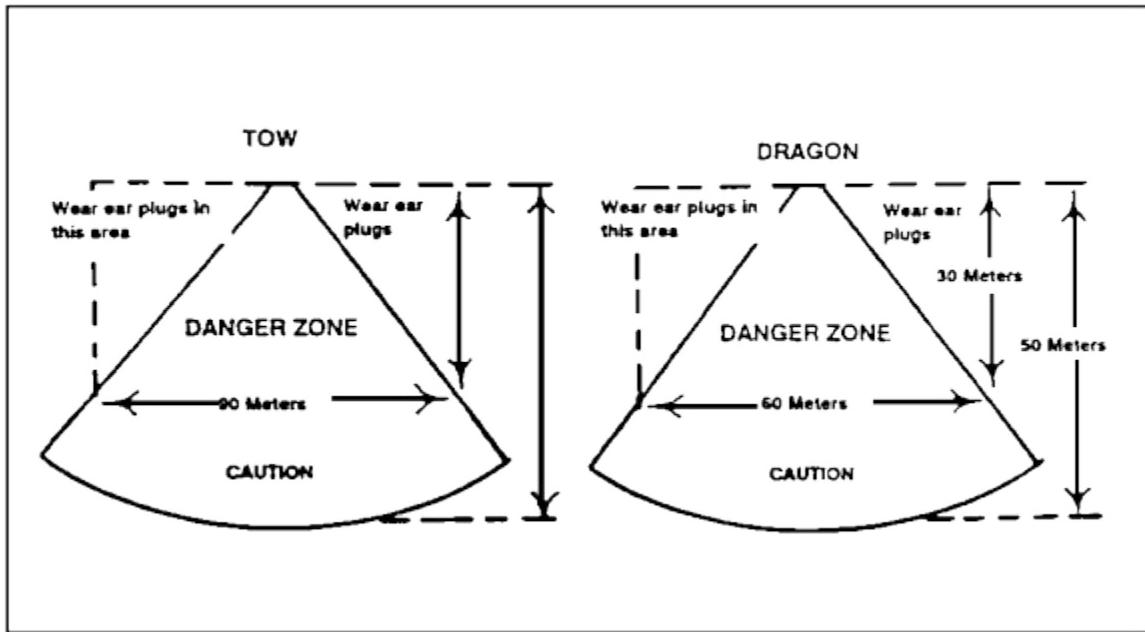


Figure 3-33. ATGM backblast in an open street.

(a) To fire a TOW from inside a room, the following safety precautions must be taken ([Figure 3-34](#)).

- The building must be of sturdy construction.
- The ceiling should be at least 7 feet high.
- The floor size of the room should be at least 15 by 15 feet; larger, if possible.
- At least 20 square feet of room ventilation should exist, preferably to the rear of the weapon. An open 7- by 3-foot door is sufficient. Additional ventilation can be created by removing sections of interior partitions.
- All personnel in the room should wear ballistic eye protection and earplugs.
- A clearance of 9 inches (23 centimeters) must be between the launch tube and aperture from which it is fired. (See AR 385-62 and AR 385-63 for more detailed safety information.)

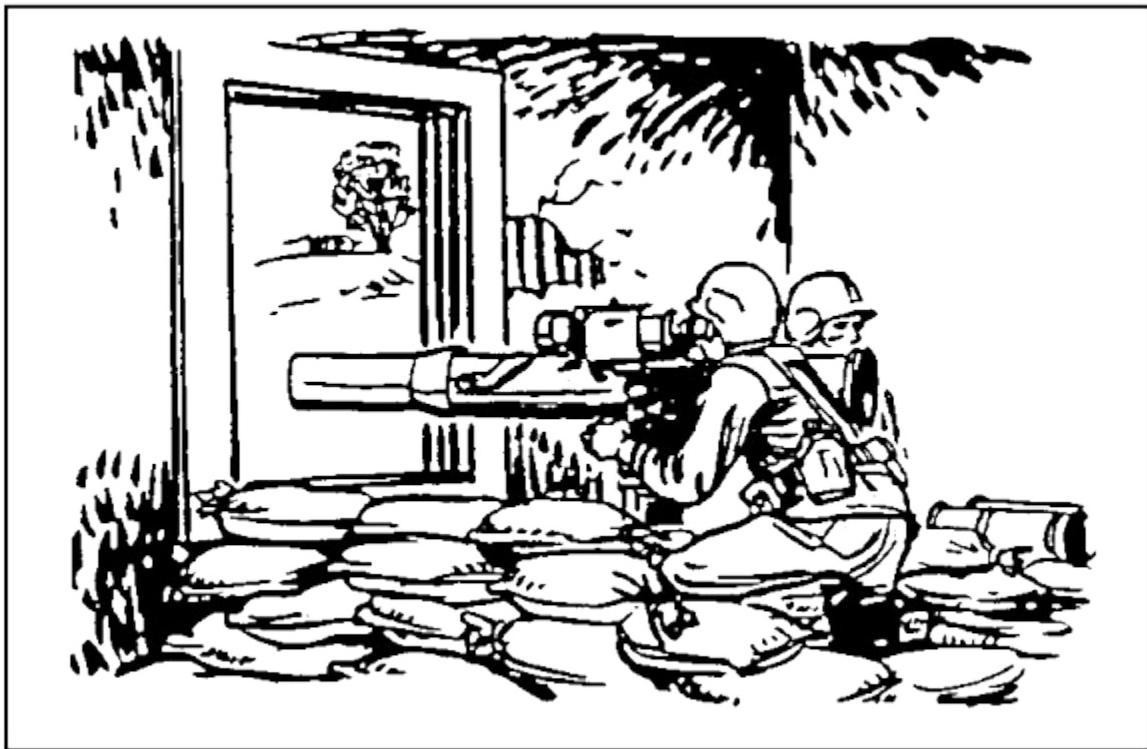


Figure 3-34. TOW fired from inside a room.

(b) To fire a Dragon from inside a room, the following safety precautions must be taken.

- The building must be of sturdy construction.
- The ceiling should be at least 7 feet high.
- The floor size should be at least 15 by 15 feet; larger, if possible.
- At least 20 square feet of ventilation should exist (room openings), preferably to the rear of the weapon. An open 7- by 3-foot door would provide minimum ventilation.
- All glass should be removed from windows, and small loose objects removed from the room.
- The room should be clean or the floors must be wet to prevent dust and dirt (kicked up by the backblast) from obscuring the vision of other soldiers in the room.
- All personnel in the room must be forward of the rear of the weapon.
- All personnel in the room must wear ballistic eye protection and earplugs.
- At least a 6-inch clearance must exist between the launch tube and aperture from which it is fired.

b. Weapon Penetration. ATGMs can penetrate and destroy heavily armored tanks. They have large warheads employing the shape-charge principle. Because of their size, these warheads can achieve significant penetration against typical urban targets. Penetration, however, does not mean a concurrent destruction of the structural integrity of a position. The shaped-charge warhead produces relatively little spall. Enemy personnel not standing directly behind or near the point of impact of an ATGM may escape injury.

(1) Standard TOW missiles. The basic TOW missile can penetrate 8 feet of packed earth, 4 feet of reinforced concrete, or 16 inches of steel plate. The improved TOW (ITOW), the TOW 2, and the TOW 2A all have been modified to improve their penetration. They all penetrate better than the basic TOW. All TOW missiles can defeat triple sandbag walls, double layers of earth filled 55-gallon drums, and 18-inch log walls.

(2) TOW 2B. The TOW 2B uses a different method of defeating enemy armor. It flies over the target and fires an explosively formed penetrator down onto the top armor, which is thinner. Because of this design feature, the TOW 2B missile cannot be used to attack nonmetallic structural targets. When using the TOW 2B missile against enemy armor, gunners must avoid firing directly over other friendly vehicles, disabled vehicles, or large metal objects such as water or oil tanks.

(3) Dragon missile. The Dragon missile can penetrate 8 feet of packed earth, 4 feet of concrete, or 13 inches of steel plate. It can attain effective short-range fire from upper stories, or from the rear or flanks of a vehicle. These engagements are targeted against the most vulnerable parts of tanks, and can entrap tanks in situations where they are unable to counterfire. Elevated firing positions increase the first-round hit probability. Firing down at an angle of 20 degrees increases the chance of a hit by 67 percent at 200 meters. A 45-degree down angle doubles the first-round hit probability, compared to a ground-level shot.

c. Breaching Structural Walls. Firing ATGMs is the least efficient means to defeat structures. Because of their small basic load and high cost, ATGMs are better used against tanks or enemy-fortified firing positions. They can be effective against bunkers or other identified enemy firing positions.

7. Flame Weapons. Flame weapons are characterized by both physical and psychological casualty-producing abilities. Flame does not need to be applied with pinpoint accuracy, but it also must not spread to structures needed by friendly forces. Large fires in built-up areas are catastrophic. If they burn out of control, fires can create an impenetrable barrier for hours. The most common United States flame weapons are the M202 FLASH and the M34 white phosphorus (WP) grenade. The M2A1-7 portable flamethrower is stored in war reserve status as a standard "C" item. Its availability is limited.

a. **Employment.** Flame weapons used against fortified positions should be aimed directly at the aperture. Even if the round or burst misses, enough flaming material enters the position to cause casualties and to disrupt the enemy occupants. The M34 WP grenade is difficult to throw far or into a small opening such as a bunker aperture. However, its effects are dramatic when thrown into a room or building.

b. **Effects.** The three standard flame weapons have different effects against typical urban targets.

(1) M202 FLASH. The M202 FLASH can deliver area fire out to 500 meters. In built-up areas, the range to targets is normally much less. Point targets, such as an alleyway or bunker, can usually be hit from 200 meters. Precision fire against a bunker aperture is possible at 50 meters.

(a) The FLASH warhead contains a thickened flame agent that ignites when exposed to air. The minimum safe combat range is 20 meters, which is the bursting radius of the rocket warhead due to splashback. If the projectile strikes a hard object along its flight path and breaks open, it will burst into flames even if the fuze has not armed. M202 rocket packs must be protected from small-arms fire and shell fragments that could ignite them. The M202 has a backblast that must be considered before firing (see [Figure 3-35](#)). Urban conditions affect this backblast exactly the same as the LAW (see [paragraph 5](#)). The same considerations for firing a LAW from an enclosed area apply to the M202.

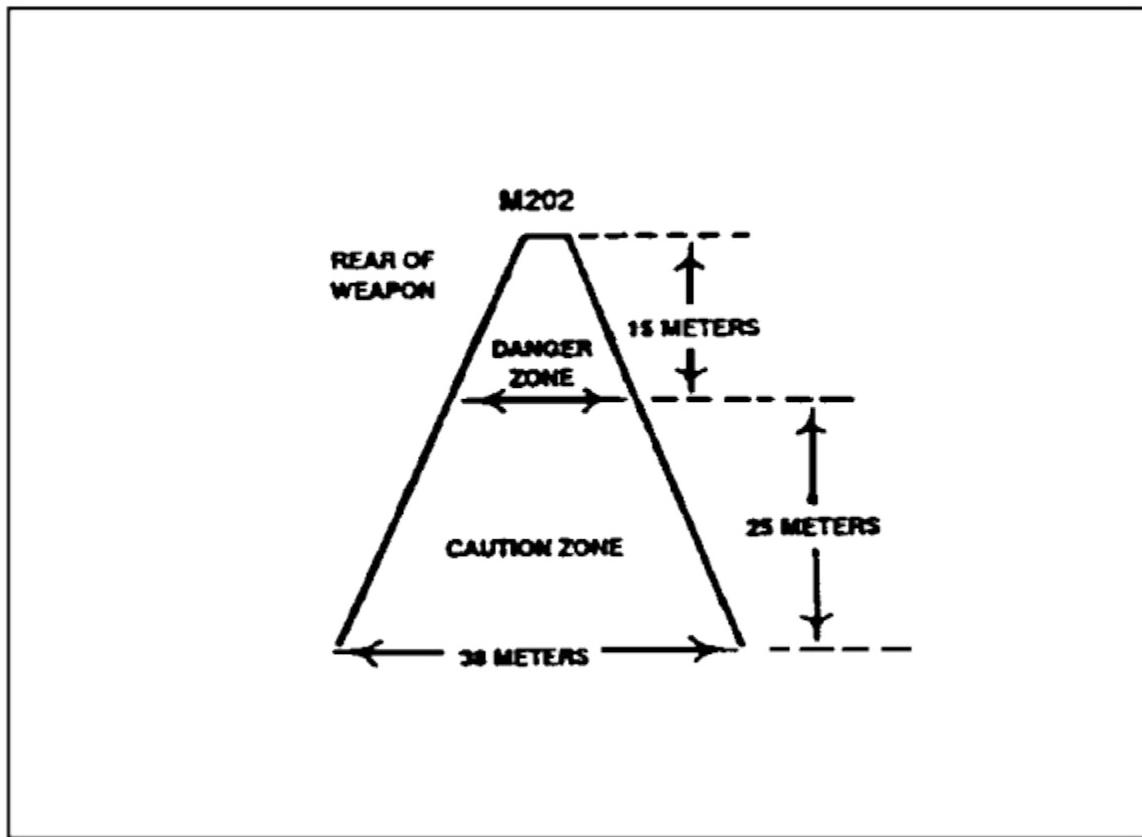


Figure 3-35. Backblast area of an M202 FLASH.

(b) The M202 FLASH is not effective in penetrating typical urban targets. It can penetrate up to 1 inch of plywood at 200 meters, and at close range it can penetrate some wooden doors. The rocket reliably penetrates window glass. The M202 does not damage brick or cinder block construction. The flame agent

splattered against the top, and rear of light armored vehicles can be effective. The psychological effect of hits by flame rockets on closed-in crewmen is significant.

(c) A round detonating near or on a vehicle's rear deck or engine compartment could set the vehicle on fire. A wheeled vehicle, such as the BTR, could have its tires severely damaged by the M202. Modern threat tanks and BMPs have an NBC protection overpressure system that could prevent flame from reaching the vehicle's interior.

(2) M34 WP Hand grenade. The M34 is used to ignite and destroy flammable objects, especially wooden structures. It is also used to create an immediate smoke cloud to conceal movement across a narrow open space such as a street. Its smoke is not toxic but can cause choking in heavy concentrations. The grenade's explosion, bright flash, smoke, and burning WP particles all combine to make the M34 one of the most effective psychological weapons available. The M34 hand grenade throws WP fragments up to 35 meters from the point of detonation. These fragments can attach to clothing or skin and continue burning. Because of its weight, most infantrymen can throw this grenade only 30 to 40 meters.

(a) The soldier must avoid injury from friendly use of the M34. As with the M202, the M34 can ignite if the WP inside is exposed to the air. Bullets and shell fragments have been known to strike and rupture M34 grenades, therefore, grenades must be protected from enemy fire.

(b) The M34 WP grenade is an effective weapon against enemy armored vehicles when used in the close confines of combat in built-up areas. It can be thrown or dropped from upper stories onto enemy vehicles. The M34 can be combined with flammable liquids, detonating cords, blasting caps, and fuze igniters to create the eagle fireball, a field-expedient anti-armor device. (See [FM 21-75](#), Appendix H.)

(c) The M34 is also excellent as a screening device. A grenade can be thrown from behind cover into an open street or plaza. When it explodes, the enemy's observation is temporarily obscured. Thus, friendly forces can quickly cross the open area--if the enemy fires, it is unaimed and presents less of a danger. If screening smoke is used to cover a squad's movement across short open areas, it will reduce expected casualties from small-arms fire by about 90 percent.

(3) M2A1-7 Portable flamethrower. Portable flame-throwers have a much shorter effective range than the M202 (20 to 50 meters) but require no special backblast consideration. The psychological and physical effects of the portable flamethrower are impressive. When used against troops behind a street barricade, the flamethrower can be fired in a traversing burst to cover a wide frontage. A blind-angle burst can be fired to exploit the splattering effect of the thickened fuel without exposing the gunner (see [Figure 3-36](#)).

(a) A burst of unlit fuel (wet shots) can be fired with the flamethrower and ignited with a subsequent shot, creating an intense fireball. This technique is effective in destroying captured equipment or for killing enemy soldiers in sewers. If the enemy has established a position in a wooden building, the building can be burned down. Flame is also effective when fired onto the back deck of tanks or at vision blocks.

(b) Thickened fuel is difficult to extinguish, and, therefore, a commander must decide what will burn before he employs flame. Limits imposed on collateral damage, either political or tactical, are the most serious constraints to the use of flames. If the portable flamethrower is issued in combat in built-up areas, it will probably be used by specially trained personnel. The infantry leader must ensure the flame operator is provided adequate security as he approaches the target. The enemy will concentrate his fire on any flamethrowers he detects.

(c) Although pinpointing targets at night is difficult, commanders should consider using flamethrowers at night for the psychological as well as destructive effect on the enemy.

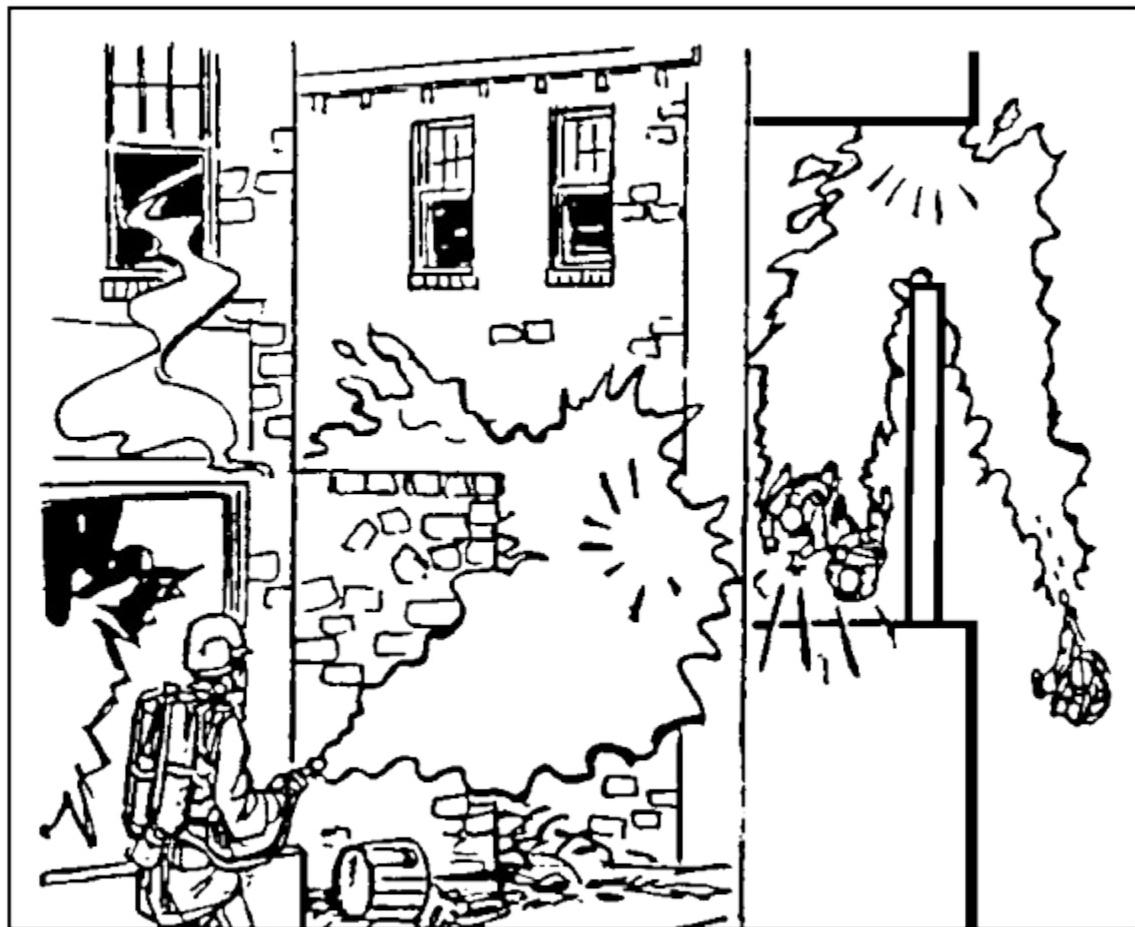


Figure 3-36. Backblast area of an M202 FLASH.

8. **Hand Grenades**. Hand grenades are used extensively during combat in built-up areas. Smoke grenades are used for screening and signalling. Riot control grenades are used to drive the enemy out of deep fortifications. Fragmentation and concussion grenades are used to clear the enemy out of rooms and basements. They are the most used explosive munition during intense combat in built-up areas. In World War II, it was common for a battalion fighting in a city to use over 500 hand grenades each day.

a. **Employment**. Smoke and riot control grenades have similar employment techniques. Fragmentation grenades are used to produce enemy casualties.

- (1) The AN-M8 HC grenade produces a dense white or grey smoke. It burns intensely and cannot be easily extinguished once it ignites. The smoke can be dangerous in heavy concentrations because it makes breathing difficult and causes choking. The M8 grenade is normally used for screening. It produces a slowly building screen of longer duration than the M34 WP grenade, without the problem of collateral damage caused by scattered burning particles.
- (2) The M18-series smoke grenades produce several different colors of smoke, which are used for signalling. Yellow smoke is sometimes difficult to see in built-up areas. Newer versions of yellow smoke grenades are more visible than before.
- (3) The M7A3 CS riot control grenade can be used to drive enemy troops out of fortifications when civilian casualties or collateral damage constraints are considerations. Built-up areas often create variable and shifting wind patterns. When using CS grenades, soldiers must prevent the irritating smoke from affecting friendly troops. The CS grenade burns intensely and can ignite flammable structures. Enemy troops wearing even rudimentary chemical protective masks can withstand intense concentrations of CS gas.
- (4) The MK3A2 offensive hand grenade, commonly referred to as the concussion grenade, produces casualties during close combat while minimizing the danger to friendly personnel. For this reason, it is the preferred hand grenade during offensive operations in a MOUT environment. The grenade produces severe concussion effects in enclosed areas. It can be used for light blasting and demolitions, and for creating breach holes in exterior walls. The concussion produced by the MK3A2 is much greater than that of the fragmentation grenade. It is very effective against enemy soldiers within bunkers, buildings, and underground passages.
- (5) The fragmentation grenade is the most commonly available grenade during combat in built-up areas. It provides suppression during room-to-room or house-to-house fighting, and it is used while clearing rooms of enemy personnel. When used at close ranges, it can be cooked off for two seconds to deny the enemy the time to throw it back. The fragmentation grenade can be rolled, bounced, or ricocheted into areas that cannot be reached by 40-mm grenade launchers. Soldiers must be cautious when throwing grenades up stairs. This is not the most desired method of employment.

b. Effects. Each type of hand grenade has its own specific effect during combat in built-up areas.

- (1) The urban area effects of smoke grenades are nominal. Smoke grenades produce dense clouds of colored or white smoke that remain stationary in the surrounding area. They can cause fires if used indiscriminately. If trapped and concentrated within a small space, their smoke can suffocate soldiers.
- (2) The fragmentation grenade has more varied effects in combat in built-up areas. It produces a large amount of small high-velocity fragments, which can penetrate sheetrock partitions and are lethal at short ranges (15 to 20 meters). Fragments lose their velocity quickly and are less effective beyond 25 meters. The fragments from a fragmentation grenade cannot penetrate a single layer of sandbags, a cinder block, or a brick building, but they can perforate wood frame and tin buildings if exploded close to their walls.
- (3) Fragmentation barriers inside rooms, consisting of common office furniture, mattress, doors, or books, can be effective against the fragmentation grenade. For this reason, a room should never be considered safe just because one or two grenades have been detonated inside. Fragmentation grenades detonated on the floor not only throw fragments laterally but also send fragments and spall downward to lower floors. Predicting how much spall will occur is difficult since flooring material varies, but wooden floors are usually affected the most.
- (4) Some foreign grenades throw fragments much larger than those of the US-made M26. Light barriers and interior walls would probably be less effective against these grenades than against the M26. A major problem with the US-made fragmentation grenade is its tendency to bounce back off hard targets. Grenades are often directed at window openings on the ground floor or second floor. At ranges as close as 20 meters, a thrower's chances of missing a standard 1-meter by 1-meter window are high. The fragmentation grenade normally breaks through standard window glass and enters a room. If the grenade strikes at a sharp angle or the glass is thick plate, the grenade could be deflected without penetrating.
- (5) Hand grenades are difficult weapons to use. They involve a high risk of fratricide. Commanders should conduct precombat training with hand grenades as part of normal preparations. Soldiers must be very careful when throwing hand grenades up stairs.
- (6) The pins of both fragmentation and concussion grenades can be replaced if the thrower decides not use the weapon. This pin replacement must be done carefully (see [FM 23-30](#)).
- (7) METT-T and ROE will dictate what type of grenade will be used to clear each room. Because of the high expenditure of grenades, units should use butt packs or assault packs to carry additional grenades of all types. Additional grenades can also be carried in empty ammunition or canteen pouches.

9. **Mortars**. The urban environment greatly restricts low-angle indirect fires because of overhead masking. While all in-direct fire weapons are subject to overhead masking, mortars are less affected than field artillery weapons due to the mortar's higher trajectory. For low-angle artillery fire, dead space is about five times the height of the building behind which the target sits. For mortar fire, dead space is only about one-half the height of the building. Because of these advantages, mortars are even more important to the infantry during combat in built-up areas.

a. **Employment**. Not only can mortars fire into the deep defilade created by tall buildings, but they can also fire out of it. Mortars emplaced behind buildings are difficult for the enemy to accurately locate, and even harder for him to hit with counterfire. Because of their light weight, even heavy mortars can be hand carried to firing positions that may not be accessible to vehicles.

(1) Mortars can be fired through the roof of a ruined building if the ground-level flooring is solid enough to withstand the recoil. If there is only concrete in the mortar platoon's area, mortars can be fired using sandbags as a buffer under the baseplates and curbs as anchors and braces. Aiming posts can be placed in dirt-filled cans.

(2) The 60-mm, 81-mm, and 107-mm mortars of the US Army have limited affect on structural targets. Even with delay fuzes they seldom penetrate more than the upper stories of light buildings. However, their wide area coverage and multioption fuzes make them useful against an enemy force advancing through streets, through other open areas, or over rubble. The 120-mm mortar is moderately effective against structural targets. With a delay fuze setting, it can penetrate deep into a building and create great destruction.

(3) Mortar platoons often operate as separate firing sections during combat in built-up areas. The lack of large open areas can preclude establishing a platoon firing position. [Figure 3-37](#) shows how two mortar sections, which are separated by only one street, can be effective in massing fires and be protected from counter-mortar fire by employing defilade and dispersion.

(4) All three of the standard mortar projectiles are useful during combat in built-up areas. High-explosive fragmentation is the most commonly used round. WP is effective in starting fires in buildings and forcing the enemy out of cellars and light-frame buildings, and it is also most effective mortar round against dug-in enemy tanks. Even near-misses blind and suppress the tank crew, forcing them to button up. Hits are difficult to achieve, but are effective.

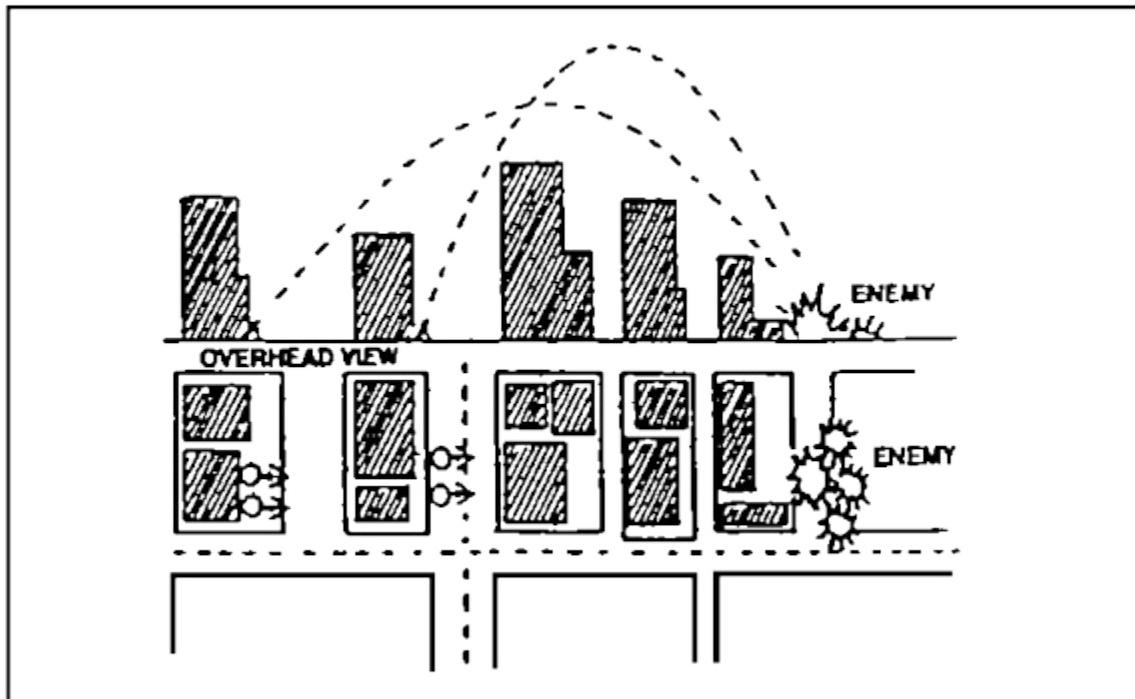


Figure 3-37. Split-section mortar operations on adjacent streets.

- (5) Because the artificial roughness of urban terrain reduces wind speed and increases atmosphere mixing, mortar smoke tends to persist longer and give greater coverage in built-up areas than in open terrain.
- (6) Urban masking impacts on the use of illumination. In built-up areas, it is often necessary to plan illumination behind friendly positions, which places friendly troops in shadows, and enemy troops in the light. Illumination rounds are difficult to adjust and are often of limited use because of the deep canyon nature of the urban area. Rapidly shifting wind currents in built-up areas also affect mortar illumination, making it less effective.

b. **Effects of Mortar Fire.** The multi-option fuze on newer United States mortar rounds makes them effective weapons on urban terrain. Delay settings can increase penetration slightly, and proximity bursts-can increase the lethal area covered by fragments. Tall buildings can cause proximity fuzed mortar rounds to detonate prematurely if they pass too closely.

- (1) 60-mm Mortar. The 60-mm mortar round cannot penetrate most rooftops, even with a delay setting. Small explosive rounds are effective, however, in suppressing snipers on rooftops and preventing roofs from being used by enemy observers. The 60-mm WP round is not normally a good screening round due to its small area of coverage. In combat in built-up areas, however, the tendency of smoke to linger and the small areas to be screened make it more effective. During the battle for Hue in South Vietnam, 60-mm WP rounds were used to create small, short-term, smoke screens to conceal movement across open areas such as parks, plazas, and bridges. Fragments from 60-mm HE rounds, landing as close as 10 feet, cannot penetrate a single sandbag layer or a single-layer brick wall. The effect of a 60-mm mortar HE round that achieves a direct hit

on a bunker or fighting position is equivalent to 1 or 2 pounds of TNT. Normally, the blast will not collapse a properly constructed bunker but can cause structural damage. The 60-mm mortar will not normally crater a hard-surfaced road.

(2) 81-mm Mortar. The 81-mm mortar has much the same effect against urban targets as the 60-mm mortar. It has a slightly greater lethal area and its smoke rounds (WP and RP) are more effective. A direct hit is equivalent to about 2 pounds of TNT. The 81-mm round cannot significantly crater a hard-surfaced road. With a delay setting, the 81-mm round can penetrate the roofs of light buildings.

(3) 107-mm Mortar. The 107-mm mortar can affect moderately hard urban targets. It is more effective than the 81-mm mortar. Even when fired with a delay fuze setting, the round cannot penetrate deep into typical urban targets. The mortar's lethal fragment area is somewhat increased in built-up areas, because its blast picks up significant amounts of debris and throws it outward. The minimum range of the 107-mm mortar is the main constraint in its employment during battle in a built-up area. Out of all the United States mortars, the 107-mm is the least capable in reaching targets in deep defilade. The 107-mm mortar slightly craters a hard-surfaced road, but not enough to prevent vehicle traffic.

(4) 120-mm Mortar. The 120-mm mortar is large enough to have a major effect on common urban targets. It can penetrate deep into a building, causing extensive damage because of its explosive power. A minimum of 18 inches of packed earth or sand is needed to stop the fragments from a 120-mm HE round that impacts 10 feet away. The effect from a direct hit from a 120-mm round is equivalent to almost 10 pounds of TNT, which can crush fortifications built with commonly available materials. The 120-mm mortar round can create a large but shallow crater in a road surface, which is not deep or steep-sided enough to block vehicular movement. However, craters could be deep enough to damage or destroy storm drain systems, water and gas pipes, and electrical or phone cables.

(5) 160-mm Mortar. The former Soviet 160-mm mortar can inflict massive damage to almost any urban structure. Only large buildings and deep cellars offer protection against this weapon. Even well-built bunkers can be crushed by near-misses. The effect from a direct hit by this weapon is equivalent to over 15 pounds of TNT. The 160-mm mortar creates significant craters in urban road surfaces. These craters are several meters wide and are deep enough to interfere with vehicular movement. The 160-mm mortar can destroy storm drainage systems, water mains, and underground power lines.

(6) 240-mm Mortar. The former Soviet 2S4 240-mm mortar is designed to destroy heavy fortifications. Average buildings do not provide certain protection from this mortar. Its HE rounds weigh over 280 pounds. It has a concrete-piercing round for use in urban areas. The 2S4 can fire one round per minute. A round will do massive damage to urban road surfaces, breaking and heaving large slabs of road surface many yards from the point of impact.

10. **25-mm Automatic Gun**. The 25-mm automatic gun mounted on the M2/M3 fighting vehicle and on the USMC LAV-25 offers infantrymen a new and effective weapon to aid them during combat in built-up areas. The primary roles of BFVs and LAV-25s during combat in built-up areas are to provide suppressive fire and to breach exterior walls and fortifications. (See [paragraph 3](#) or the suppression effects and penetration of the 7.62-mm coaxial machine gun.) The wall and fortification breaching effects of the 25-mm automatic gun are major assets to infantrymen fighting in built-up areas.

a. **Obliquity**. The 25-mm gun produces its best urban target results when fired perpendicular to the hard surface (zero obliquity). In combat in built-up areas, however, finding a covered firing position that permits low obliquity firing is unlikely, unless the streets and gaps between buildings are wide. Most shots impact the target at an angle, which normally reduces penetration. With the APDS-T round, an angle of obliquity of up to 20 degrees can actually improve breaching. The rounds tend to dislodge more wall material for each shot but do not penetrate as deeply into the structure.

b. **Target Types**. The 25-mm gun has different effects when fired against different urban targets.

(1) **Reinforced concrete**. Reinforced concrete walls, which are 12 to 20 inches thick, present problems for the 25-mm gun when trying to create breach holes. It is relatively easy to penetrate, fracture, and clear away the concrete, but the reinforcing rods remain in place. These create a "jail window" effect by preventing entry but allowing grenades or rifle fire to be placed behind the wall. Steel reinforcing rods are normally 3/4 inch thick and 6 to 8 inches apart - there is no quick way of cutting these rods. They can be cut with demolition charges, cutting torches, or special power saws. Firing with either APDS-T or HEI-T rounds from the 25-mm gun will not always cut these rods.

(2) **Brick walls**. Brick walls are more easily defeated by the 25-mm gun regardless of their thickness, and they produce the most spall.

(3) **Bunker walls**. The 25-mm gun is devastating when fired against sandbag bunker walls. Obliquity has the least affect on the penetration of bunker walls. Bunkers with earth walls up to 36 inches thick are easily penetrated. At short ranges typical of combat in built-up areas, defeating a bunker should be easy, especially if the 25-mm gun can fire at an aperture.

c. **Burst Fire**. The 25-mm gun's impact on typical urban targets seem magnified if the firing is in short bursts. At close ranges, the gunner might need to shift his point of aim in a spiral pattern to ensure that the second and third bursts enlarge the hole. Even without burst fire, sustained 25-mm gun fire can defeat almost all urban targets.

d. **Weapon Penetration**. The penetration achieved by the two combat rounds (HEI-T and APDS-T) differ slightly - both are eventually effective. However, the best target results are not achieved with either of the combat rounds. At close range against structural targets, the training round (TP-T) is significantly more effective. The TP-T round, however, has little utility when used against enemy armored vehicles. It will rarely, if ever, be carried into combat.

(1) APDS-T. The armor-piercing, discarding, sabot with tracer round penetrates urban targets by retaining its kinetic energy and blasting a small hole deep into the target. The APDS-T round gives the best effects behind the wall, and the armor-piercing core often breaks into two or three fragments, which can create multiple enemy casualties. The APDS-T needs as few as four rounds to achieve lethal results behind walls. Table 3-10 explains the number of APDS-T rounds needed to create different-size holes in common urban walls.

(a) When firing single rounds, the APDS-T round provides the greatest capability for behind-the-wall incapacitation. The APDS-T round can penetrate over 16 inches of reinforced concrete with enough energy left to cause enemy casualties. It penetrates through both sides of a wood frame or brick veneer building. Field fortifications are easily penetrated by APDS-T rounds. Table 3-11 explains the number of APDS-T rounds needed to create different-size holes in commonly found bunkers.

TARGET	LOOPHOLE	BREACHHOLE
3-inch brick wall at 0-degree obliquity	22 rounds	75 rounds
3-inch brick wall at 45-degree obliquity	22 rounds	35* rounds
5-inch brick wall at 0-degree obliquity	32 rounds	50* rounds
8-inch reinforced concrete at 0-degree obliquity	22 rounds	75 rounds (Note: Reinforcing rods still in place)
8-inch reinforced concrete at 45-degree obliquity	22 rounds	40* rounds (Note: Reinforcing rods still in place)
*Obliquity and depth tend to increase the amount of wall material removed.		

Table 3-10. Breaching effects of APDS-T rounds.

TYPE BUNKER	OBLIQUITY	PENETRATION	LOOPHOLE	SMALL BREACHHOLE
36-inch sand/timber	0 degree	1 round	25 rounds	40 rounds
36-inch sand/ 6-inch concrete	0 degree	6 rounds	6 rounds	20 rounds

Table 3-11. Number of APDS-T rounds needed to create different-size holes in bunkers.

(b) The APDS-T round creates a hazardous situation for exposed personnel because of the pieces of sabot that are thrown off the round. Personnel not under cover forward of the 25-mm gun's muzzle and within the danger zone could be injured or killed by these sabots, even if the penetrator passes overhead to hit the target. The danger zone extends at an angle of about 10 degrees below the muzzle level, out to at least 100 meters, and about 17 degrees left and right of the muzzle. Figure 3-38 shows the hazard area of the APDS-T round.

(2) HEI-T. The high-explosive, incendiary with tracer round penetrates urban targets by blasting away chunks of material.

(a) The HEI-T rounds does not penetrate an urban target as well as the APDS-T, but it creates the effect of stripping away a greater amount of material for each round. The HEI-T does more damage to an urban target when fired in multiple short bursts because the accumulative impact of multiple rounds is greater than the sum of individual rounds. Table 3-12 explains the number of HEI-T rounds needed to create different-size holes.

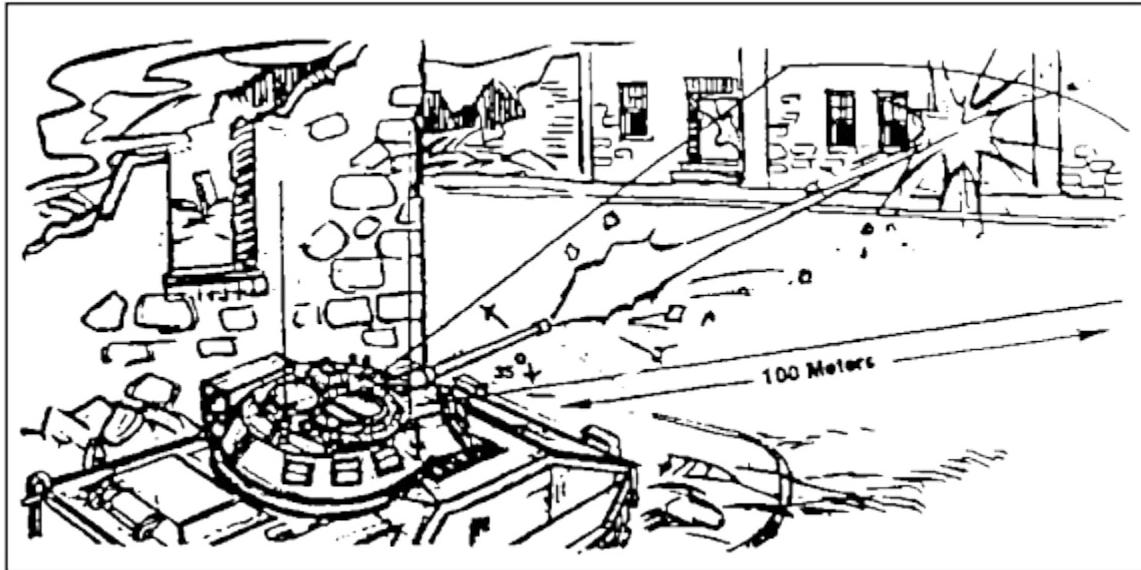


Figure 3-38. APDS danger zone.

TARGET	LOOPHOLE	BREACHHOLE
3-inch brick wall at 0-degree obliquity	10 rounds	20 rounds
3-inch brick wall at 45-degree obliquity	20 rounds	25 rounds
5-inch brick wall at 0-degree obliquity	30 rounds	60 rounds
8-inch reinforced concrete at 0-degree obliquity	15 rounds	25 rounds
8-inch reinforced concrete at 45-degree obliquity	15 rounds	30 rounds

Table 3-12. Number of HEI-T rounds needed to create different-size holes.

(b) The HEI-T rounds does not provide single-round perforation or incapacitating fragments on any external masonry structural wall. It can create first-round fragments behind wood frame and brick veneer walls. HEI-T rounds cannot penetrate a bunker as quickly as APDS-T, but they can create more damage

inside the bunker once the external earth has been stripped away. Against a heavy bunker, about 40 rounds of HEI-T are needed to strip away the external earth shielding and breach the inner lining of concrete or timber. The HEI-T round is also used for suppression against known or suspected firing ports, such as doors, windows, and loopholes.

11. **Tank Cannon.** The powerful, high-velocity cannon mounted on the M1, M1A1, M60, and M48 series tanks provides the infantryman with a key requirement for victory in built-up areas - heavy direct-fire support. Although the infantry assumes the lead role during combat in built-up areas, tanks and infantry work as a close team. Tanks move down streets after the infantry has cleared them of any suspected ATGM positions and, in turn, support the infantry with fire. The tank is one of the most effective weapons for heavy fire against structures. The primary role of the tank cannon in built-up areas is to provide heavy direct-fire against buildings and strongpoints that are identified as targets by the infantry. The wall and fortification breaching effects of the 105-mm and 120-mm tank cannon are major assets to infantrymen fighting in built-up areas.

a. **Obliquity.** Tank cannons produce their best urban target effects when fired perpendicular to the hard surface (zero obliquity). During combat in built-up areas, however, finding a covered firing position that permits low-obliquity firing is unlikely. Most shots strike the target at an angle that would normally reduce penetration. With tank cannon APDS rounds, obliquity angles up to 25 degrees have little affect, but angles greater than 45 degrees greatly reduce penetration. For example, a 105-mm APDS round cannot penetrate a 2-inch reinforced concrete wall at an angle of obliquity greater than 45 degrees due to possible ricochet.

b. **Ammunition.** Armor-piercing, fin-stabilized, discarding sabot (APFSDS) rounds are the most commonly carried tank ammunition. These rounds are best against armored vehicles. Other types of ammunition can be carried that are more effective against masonry targets. The 105-mm cannon has HEAT and WP rounds in addition to APDS. The 120-mm cannon has an effective high-explosive, antitank, multipurpose (HEAT-MP) round.

c. **Characteristics.** Both 105-mm and 120-mm tank cannons have two specific characteristics that affect their employment in built-up areas: Limited elevation and depression, and short arming ranges. In addition, the M1 and M1A1 tanks have another characteristic not involved with its cannon but affecting infantrymen working with it - extremely hot turbine exhaust

(1) The cannon of the M1 and M1A1 tank can be elevated +20 degrees or depressed -10 degrees. The M60 and M48-series tanks have upper limits of +19 degrees and lower limits of -10 degrees. The lower depression limit creates a 35-foot (10.8-meter) dead space around a tank. On a 16-meterwide street (common in Europe) this dead space extends to the buildings on each side (see [Figure 3-39](#)). Similarly, there is a zone overhead in which the tank cannot fire. This dead space offers ideal locations for short-range anti-armor weapons and allows hidden enemy gunners to fire at the tank when the tank cannot fire back (see [Figure 3-40](#)). It also exposes the tank's most vulnerable area: the flanks, rear, and top. Infantrymen must move ahead, alongside, and to the rear of tanks to provide close protection. The extreme heat produced immediately to the rear of

the M1-series tanks prevents dismounted infantry from following closely, but protection from small-arms fire and fragments is still provided by the tank's bulk and armor. The M1-series tanks also have a blind spot caused by the 0-degree of depression available over part of the back deck. To engage any target in this area, the tank must pivot to convert the rear target to a flank target.

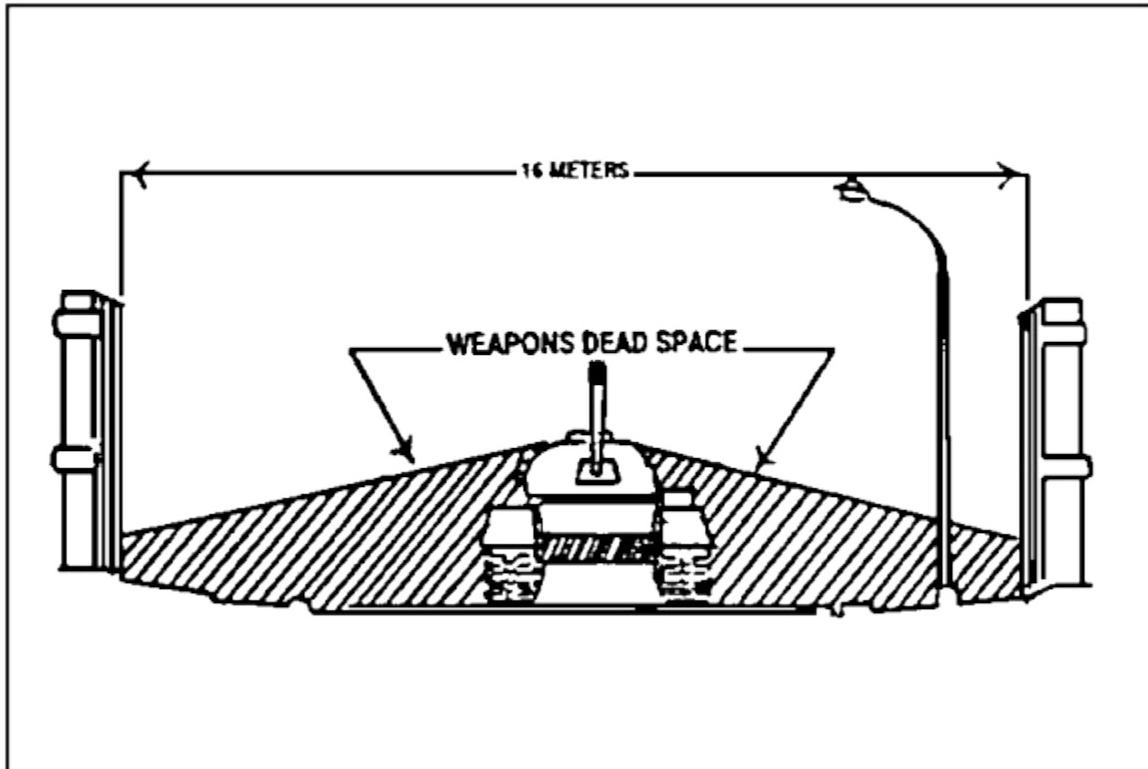


Figure 3-39. Tank cannon dead space at street level.

(2) The 105-mm HEAT round arms within 25 to 30 feet, and the 120-mm HEAT-MP round arms at about 36 feet. These arming distances allow the tank to engage targets from short ranges. The armor of the tank protects the crew from both the blowback effects of the round and enemy return fire. The APFSDS round does not need to arm and can, therefore, be fired at almost any range. The discarding portions of the round can be lethal to exposed infantry forward of the tank.

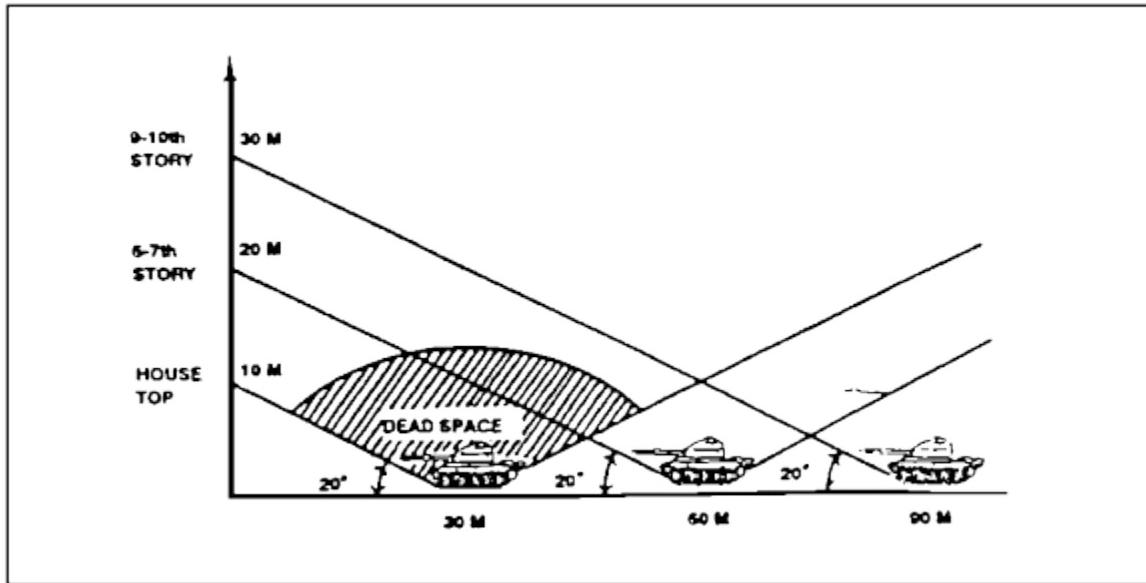


Figure 3-40. Tank cannon dead space above street level.

d. **Target Effects.** High-explosive, antitank rounds are most effective against masonry walls. The APFSDS round can penetrate deeply into a structure but does not create as large a hole or displace as much spall behind the target. In contrast to lighter HEAT rounds, tank HEAT rounds are large enough to displace enough spall to inflict casualties inside a building. One HEAT round normally creates a breach hole in all but the thickest masonry construction - brick veneer and wood frame construction are demolished by a single round. Even the 120-mm HEAT round cannot cut all the reinforcing rods, which are usually left in place, often hindering entry through the breach hole (see [Figure 3-41](#)). Both HEAT and APFSDS rounds are effective against all field fortifications. Only large earth berms and heavy mass construction buildings can provide protection against tank fire.

e. **Employment.** Tank-heavy forces could be at a severe disadvantage during combat in built-up areas, but a few tanks working with the infantry can be most effective, especially if they work well together at the small-unit level. Tank, infantry, and engineer task forces are normally formed to attack a fortified area. Individual tanks or pairs of tanks can work together with rifle squads or platoons.

(1) Tanks need infantry on the ground to provide security in built-up areas and to designate targets. Against targets protected by structures, tanks should be escorted forward to the most covered location that provides a clear shot. On-the-spot instructions by the infantry unit leader ensures that the tank's fire is accurate and its exposure is limited. The tank commander may have to halt in a covered position, dismount, and reconnoiter his route forward into a firing position.

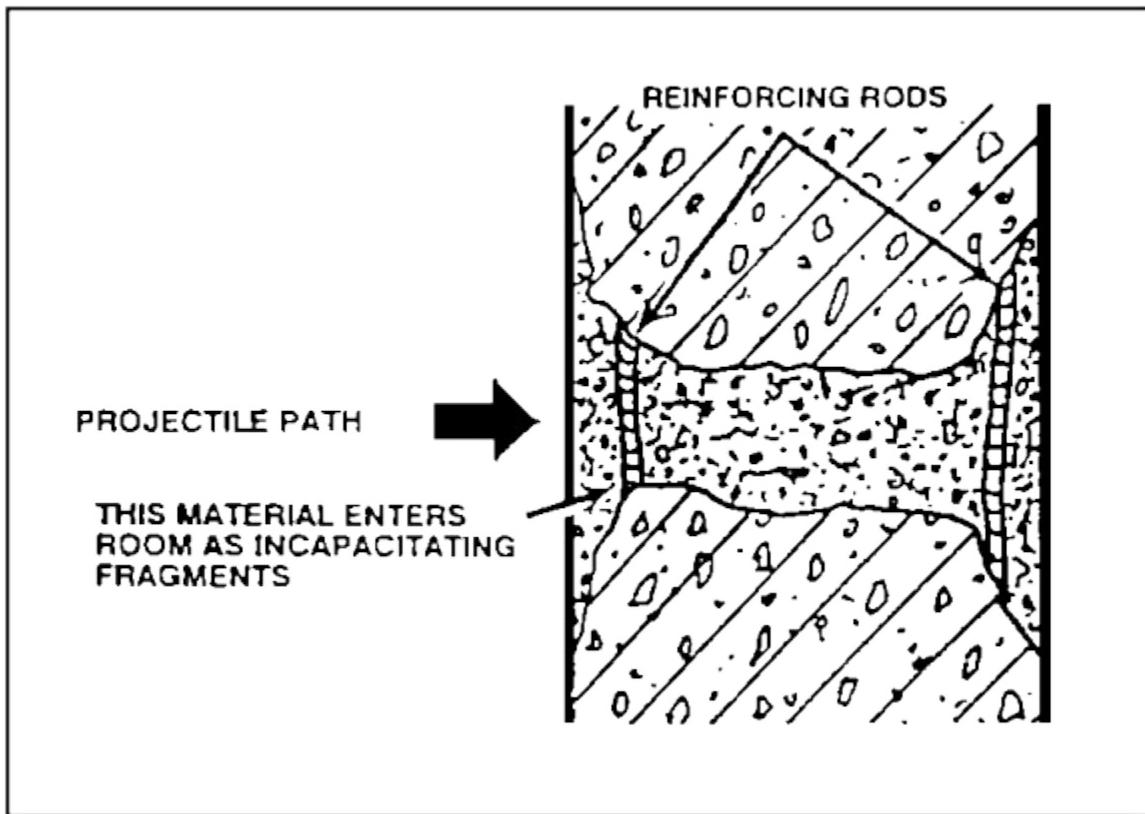


Figure 3-41. Tank HEAT round effects on reinforced concrete walls.

- (2) When the tank main gun fires, it creates a large fireball and smoke cloud. In the confines of a built-up area, dirt and masonry dust are also picked up and add to this cloud. The target is further obscured by the smoke and dust of the explosion. Depending on the local conditions, this obscuration could last as long as two or three minutes. Infantry can use this period to reposition or advance unseen by the enemy. Caution must be exercised, however, because the enemy might also move.
- (3) Tank cannon creates an overpressure and noise hazard to exposed infantrymen. All dismounted troops working near tanks should wear their Kevlar helmet and protective vest, as well as ballistic eye protection. If possible, they should also wear earplugs and avoid the tank's frontal 60-degree arc during firing.
- (4) Tanks are equipped with powerful thermal sights that can be used to detect enemy personnel and weapons that are hidden in shadows and behind openings. Dust, fires, and thick smoke significantly degrade these sights.
- (5) Tanks have turret-mounted grenade launchers that project screening smoke grenades. The grenades use a bursting charge and burning red phosphorous particles to create this screen. Burning particles can easily start uncontrolled fires and are hazardous to dismounted infantry near the tank. The tank commander and the infantry small-unit leader must coordinate when and under what conditions these launchers can be used. Grenade launchers are a useful feature to protect the tank but can cause significant problems if unwisely employed.

(6) The tank's size and armor can provide dismounted infantry with cover from direct-fire weapons and fragments. With coordination, tanks can provide moving cover for infantrymen as they advance across small open areas. However, enemy fire striking a tank but not penetrating is a major threat to nearby infantry. Fragmentation generated by antitank rounds and ricochets off tank armor have historically been a prime cause of infantry casualties while working with tanks in built-up areas.

(7) Some tanks are equipped with dozer blades that can be used to remove rubble barriers under fire, breach obstacles, or seal exits.

12. Combat Engineer Vehicle Demolition Gun. The CEV is a special-purpose engineer equipment vehicle. It provides a heavy demolition capability. The CEV has a 7.62-mm machine gun that is coaxially mounted. It also has a .50 caliber machine gun in the commander's cupola, and a 165-mm main gun. The main gun fires a high-explosive plastic (HEP) round of great power. The weapon's maximum range is 925 meters.

a. **Target Effects.** The HEP round is very effective against masonry and concrete targets. The pushing and heaving effects caused by the HEP round's base detonating fuze and large amount of explosive can demolish barriers and knock down walls. One round produces a 1-foot diameter hole in a 7-inch thick reinforced concrete wall. The round's effects against bunkers and field fortifications are dramatic, often crushing or smashing entire walls.

b. **Employment.** The CEV is normally used for special engineer tasks in direct support of infantry battalions. It must be given the same close infantry protection and target designation as tanks. Although the CEV consists of a tank hull and a short-barreled turret, it is not a tank and should not be routinely used against enemy tanks. It is an excellent heavy assault support vehicle when used as part of a combined engineer-infantry team.

13. Artillery and Naval Gunfire. A major source of fire support for infantry forces fighting in built-up areas is the fire of field artillery weapons. If the built-up area is near the coast, naval gunfire can be used. Field artillery employment can be in either the indirect- or direct-fire mode.

a. **Indirect Fire.** Indirect artillery fire is not effective in attacking targets within walls and masonry structures. It tends to impact on roofs or upper stories rather than structurally critical wall areas or pillars.

(1) Weapons of at least 155-mm are necessary against thick reinforced concrete, stone, or brick walls. Even with heavy artillery, large expenditures of ammunition are required to knock down buildings of any size. Tall buildings also create areas of indirect-fire dead space, which are areas that cannot be engaged by indirect fire due to a combination of building height and angle of fall of the projectile (see [Figure 3-42](#)). Usually the dead space for low-angle indirect fire is about five times the height of the highest building over which the rounds must pass.

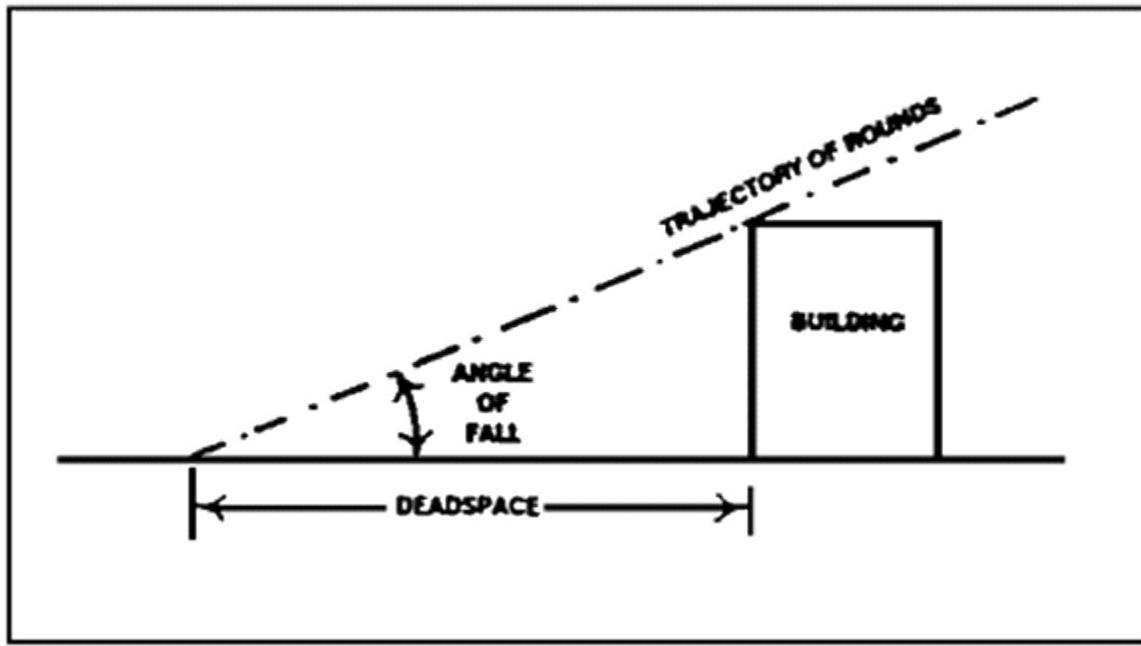


Figure 3-42. Indirect-fire dead space (low angle).

(2) Even when it is theoretically possible to hit a target in a street over a tall building, another problem arises because of range probable error (PE). Only 50 percent of the rounds fired on the same data can be expected to fall within one range PE of the target. This means that when firing indirect fire into built-up areas with tall buildings, it is necessary to double the normal ammunition expenditure to overcome the problem of a reduced target area and range PE. Also, up to 25 percent of all HE rounds are duds due to glancing off hard surfaces.

(3) Naval gunfire, because of its flat trajectory, is even more affected by terrain masking. It is usually difficult to adjust onto the target, because the gun-target line is constantly changing.

b. **Direct Fire.** Self-propelled artillery pieces are not as heavily armored as tanks, but they can still be used during combat in built-up areas if adequately secured by infantry. The most likely use of US artillery in an urban direct-fire role is to reinforce tank fires against tough or important urban targets. Because of their availability and habitual relationship with infantry, tanks remain a more common direct-fire support means than self-propelled artillery. Self-propelled artillery should be used in this role only after an analysis of the need for heavy direct fire and the tradeoff involved in the extreme decentralization of artillery firepower. It has the same need for close security and target designation as tanks.

c. **Target Effects.** Medium caliber (155-mm) and heavy caliber (203-mm) direct fire has a devastating affect against masonry construction and field fortifications. Smaller artillery pieces (105-mm) are normally towed and, therefore, are difficult to employ in the direct-fire mode. Their target effects are much less destructive than the larger caliber weapons.

(1) 155-mm Howitzers. The 155-mm self-propelled howitzer offers its crew mobility and limited protection in built-up areas. It is effective due to its rate of fire and

penetration. High-explosive rounds can penetrate up to 38 inches of brick and unreinforced concrete. Projectiles can penetrate up to 28 inches of reinforced concrete with considerable damage beyond the wall. HE rounds fuzed with concrete-piercing fuzes provide an excellent means of penetrating strong reinforced concrete structures. One round can penetrate up to 46 inches. Five rounds are needed to reliably create a 1.5-meter breach in a 1-meter thick wall. About 10 rounds are needed to create such a large breach in a wall 1.5 meters thick. Superquick fusing causes the rubble to be blown into the building, whereas delay fusing tends to blow the rubble outward into the street.

(2) 203-mm Howitzers. The 203-mm howitzer is the most powerful direct-fire weapon available to the Army. It has a slow rate of fire, but its projectile has excellent penetration abilities. One round normally creates a breach hole in walls up to 56 inches thick. The howitzer crew is exposed to enemy fire. The vehicle only carries three rounds on board, which limits its use.

(3) Naval cannon. The most common naval cannon used to support ground troops is the 5-inch gun. In either single or double mounts, this weapon has a high rate of fire and is roughly equivalent to the 155-mm howitzer in target effect.

14. Aerial Weapons. Both rotary- and fixed-wing aircraft can quickly deliver large volumes of firepower over large built-up areas. Specific targets are hard to distinguish from the air. Good ground-to-air communications are vital to successfully employing aerial firepower. Aviators have historically tended to overestimate the effects on defenders of high-explosive ordnance. Modern, large buildings are remarkably resistant to damage from bombs and rocket fire.

a. **Rotary-Winged Aircraft**. Armed attack helicopters can be used to engage targets in built-up areas. Enemy armored vehicles in small parks, boulevards, or other open areas are targets for attack helicopters.

NOTE:

The target effects of TOW missiles and 40-mm grenades carried by attack helicopters have already been discussed.

(1) The HELLFIRE missile has a larger warhead and greater range than the TOW, but it too is a shaped-charge warhead and is not specifically designed for use against masonry targets. Laser target designation for the HELLFIRE may not be possible due to laser reflections off glass and shiny metal surfaces. The use of attack helicopters to deliver ATGMs against targets in the upper stories of high buildings is sometimes desirable.

(2) The 2.75-inch folding fin aerial rocket and the 20-mm cannon common to some attack helicopters are good area weapons to use against enemy forces in the open or under light cover. They are usually ineffective against a large masonry target. The 20-mm cannon produces many ricochets, especially if AP ammunition is fired into build-up areas.

(3) The 30-mm cannon carried by the Apache helicopter is an accurate weapon. It penetrates masonry better than the 20-mm cannon.

b. **Fixed-Wing Aircraft.** Close air support to ground forces fighting in built-up areas is a difficult mission for fixed-wing aircraft. Targets are hard to locate and identify, enemy and friendly forces could be intermingled, and enemy short-range air defense weapons are hard to suppress.

(1) Because enemy and friendly forces can be separated by only one building, accurate delivery of ordnance is required. Marking panels, lights, electronic beacons, smoke, or some other positive identification of friendly forces is needed.

(2) General-purpose bombs from 500 to 2,000 pounds are moderately effective in creating casualties among enemy troops located in large buildings. High-dive angle bomb runs increase accuracy and penetration but also increase the aircraft's exposure to antiaircraft weapons. Low-dive angle bomb runs using high drag (retarded) bombs can be used to get bombs into upper stories. Penetration is not good with high-drag bombs. Sometimes aerial bombs pass completely through light-clad buildings and explode on the outside.

(3) Aerial rockets and 20-mm cannons are only moderately effective against enemy soldiers in built-up areas since rockets lack the accuracy to concentrate their effects. The 20-mm cannon rounds penetrate only slightly better than the .50 caliber round; 20-mm AP rounds can ricochet badly; and tracers can start fires.

(4) The 30-mm cannon fired from the A-10 aircraft is an accurate weapon. It is moderately effective against targets in built-up areas, penetrating masonry better than the 20-mm cannon.

(5) The AC-130 aircraft has weapons that can be most effective during combat in built-up areas. This aircraft can deliver accurate fire from a 20-mm Vulcan cannon, 40-mm rapid-fire cannon, and 105-mm howitzer. The 105-mm howitzer round is effective against the roof and upper floors of buildings. The AC-130 is accurate enough to concentrate its 40-mm cannon and 105-mm howitzer fire onto a single spot to create a rooftop breach, which allows fire to be directed deep into the building.

(6) Laser and optically guided munitions can be effective against high-value targets. The USAF has developed special, heavy, laser-guided bombs to penetrate hardened weapons emplacements. Problems associated with dense smoke and dust clouds hanging over the built-up area and laser scatter can restrict their use. If the launching aircraft can achieve a successful laser designation and lock-on, these weapons have devastating effects, penetrating deep into reinforced concrete before exploding with great force. If launched without a lock-on, or if the laser spot is lost, these weapons are unpredictable and can travel long distances before they impact.

15. **Demolitions**. Combat in built-up areas requires the extensive use of demolitions. All soldiers, not just engineer troops, should be trained to employ demolitions. (See FM 5-25 for specific information on the safe use of demolitions.)

a. **Bulk Demolitions**. Bulk demolitions come in two types, TNT and C4. Exposed soldiers must take cover or move at least 300 meters away from bulk explosives that are being used to breach walls.

(1) TNT comes in 1/4, 1/2, and 1-pound blocks. About 5 pounds of TNT are needed to breach a non-reinforced concrete wall 12 inches thick if the explosives are laid next to the wall and are not tamped. If the explosives are tamped, about 2 pounds are sufficient.

(2) C4 comes in many different sized blocks. About 10 pounds of C4 placed between waist and chest high will blow a hole in the average masonry wall large enough for a man to walk through.

b. **Shaped Charges**. There are two sizes of US Army shaped charges, a 15-pound M2A3 and a 40-pound M3A3. The M3A3 is the most likely shaped charge to be used in built-up areas. It can penetrate 5 feet of reinforced concrete. The hole tapers from 5 inches down to 2 inches. The amount of spall thrown behind the target wall is considerable. There is also a large safety hazard area for friendly soldiers.

c. **Satchel Charges**. There are two standard US Army satchel charges: the M183 and the M37. Both come in their own carrying satchel with detonators and blasting cords. Each weighs 20 pounds. The M183 has 16 individual 1 1/4-pound blocks that can be used separately. When used untamped, a satchel breaches a 3-foot thick concrete wall. Satchel charges are very powerful. Debris is thrown great distances. Friendly troops must move away and take cover before detonation.

d. **Cratering Charges**. The standard US Army cratering charge is a 43-pound cylinder of ammonium nitrate. This explosive does not have the shattering effect of bulk TNT or C4. It is more useful in deliberate demolitions than in hasty ones.

BRADLEY FIGHTING VEHICLE

Bradley fighting vehicle platoons and squads seldom fight alone in built-up areas. They normally fight as part of their company or in a company team.

1. Employment

Fighting in built-up areas is centered around prepared positions in houses and buildings. Such positions cover street approaches and are protected by mines, obstacles, and booby traps. Therefore, bridges, overpasses, and buildings must be inspected and cleared of mines before they are used. Reconnaissance parties must ascertain the weight-supporting capacity of roads, bridges, and floors to determine if they can support the weight of BFVs and tanks.

2. Target Engagement.

Streets and alleys are ready-made firing lanes and killing zones. Because of this, all vehicle traffic is greatly restricted and canalized, and subject to ambush and short-range attack. Tanks are at a disadvantage because their main guns cannot be elevated enough to engage targets on the upper floors of tall buildings. The BFV, with +60 to -10 degrees elevation of the 25-mm gun and 7.62-mm coax machine gun, has a much greater ability in this role. With firing port weapons, the BFV can also place suppressive fire at ground level at the same time to the flanks and rear of each vehicle. A tank is restricted in its ability to provide this support.

3. Bradley Fighting Vehicles And Tanks. BFVs and tanks are not employed alone. Working as a team, dismounted infantrymen (the rifle team) provide security. In turn, the BFVs and tanks provide critical fire support for the rifle teams.

- a. When moving, BFVs should stay close to a building on either side of the street. This allows each BFV to cover the opposite side of the street. BFVs can button up for protection, but the BFV crew must remain alert for signals from dismounted infantry. Cooperation between the rifle team and the BFV team in a built-up environment is critical. Visual signals should be developed, telephones used where possible, and rehearsals and training conducted.
- b. Commanders should consider using the long-range fires of the tank's main armament from overwatch positions. The BFV, with its greater capability to depress and elevate the 25-mm gun, can provide some of the support previously derived from tanks within the built-up area.
- c. Because the BFV, while having better armor protection than the M113, lacks adequate armor protection to withstand medium to heavy ATGM fire, it is normally employed after the area has been cleared of ATGM positions or on terrain dominating the city to provide long-range anti-armor support. A great portion of the platoon's short-range anti-armor fires in built-up areas is provided by LAWs and Dragons. The BFVs 25-mm gun and machine gun are employed while providing direct fire support.

DEFENSE

Most defensive fighting is performed by the rifle teams. It is harder to build the platoon's defense around the BFV in cities than in other types of terrain, but the BFV element's role is still important. A platoon normally defends from positions in one to three buildings, depending on the size and strength of the buildings, the size of the platoon, and the disposition of the buildings.

1. Missions. Defensive missions of the rifle teams and BFV teams are discussed herein.

- a. The following are typical missions of rifle teams in the defense:
 - (1) Preparing defensive positions.
 - (2) Providing observation and security to prevent enemy infiltration.
 - (3) Engaging and defeating assaulting enemy forces.
 - (4) Acquiring targets for engagement by tanks and BFV weapons.

- (5) Protecting tanks and BFVs from close anti-armor weapons.
 - (6) Emplacing demolitions and obstacles (supported by combat engineers).
- b. The following are typical missions of BFV teams in the defense:
- (1) Providing fire support for the rifle teams and mutual support to other BFV teams.
 - (2) Destroying enemy armored vehicles and direct fire artillery pieces.
 - (3) Neutralizing or suppressing enemy positions with 25-mm gun and 7.62-mm coaxial machine gun fire in support of local counterattacks.
 - (4) Destroying or making enemy footholds untenable by fire using the 25-mm gun.
 - (5) Providing rapid, protected transport for the rifle teams.
 - (6) Reinforcing threatened areas by movement through covered and concealed routes to new firing positions.
 - (7) Providing mutual support to other anti-armor fires.
 - (8) Providing resupply of ammunition and other supplies to the dismount teams.
 - (9) Evacuating casualties from the area of direct fire.

NOTE:

In the last two missions, the overall value of the BFV to the defense must be weighed against the need to re-supply or to evacuate casualties.

2. Development of the defense. The platoon leader must consider the following when developing his defense:

- a. **Dispersion**. Defensive positions in two mutually supporting buildings is better than having positions in one building that can be bypassed.
- b. **Fields of Fire**. Positions should have good fields of fire in all directions. Broad streets and open areas, such as parks, offer excellent fields of fire.
- c. **Observation**. The buildings selected should permit observation into the adjacent sector. The higher stories offer the best observation but also attract enemy fire.
- d. **Concealment**. City buildings provide excellent concealment. Obvious positions, especially at the edge of a built-up area, should be avoided since they are the most likely to receive the heaviest enemy fire.
- e. **Covered Routes**. These are used for movement and re-supply, and are best when they go through or behind buildings.
- f. **Fire Hazard**. Buildings that burn easily should be avoided.
- g. **Time**. Buildings that need extensive preparations are undesirable when time is a factor.

h. **Strength.** Buildings in which BFVs or tanks are to be placed must withstand the weight of the vehicles and the effects of their weapon systems.

3. Fire Plan Positions. The BFV should be integrated into the platoon fire plan. The 25-mm gun and 7.62-mm coax machine gun fields of fire should cover streets and open areas. Once placed in position, BFVs should not be moved for logistical or administrative functions. Other vehicles should accomplish these functions, when possible.

a. Once the platoon leader chooses the building(s) he will defend, he positions his BFV teams and rifle teams. BFVs and dismounted machine guns should be positioned to have grazing fire.

Dragons should be positioned on upper stories for longer range and to permit firing at the tops of tanks. Squads should be assigned primary and, if feasible, supplementary and alternate positions for their rifle teams and BFV teams. These positions should permit continuous coverage of the primary sectors and all-round defense.

b. None of the platoon's anti-armor weapons can be fired from unvented or enclosed rooms.

However, the TOW can be fired from any room that a BFV can be placed in, as long as all hatches are closed and there are no dismounted troops in the room.

c. Due to the close engagement ranges on urban terrain, the 25-mm gun and 7.62-mm coaxial machine gun are used more than the TOW. The anti-armor capability of the BFV is degraded by short ranges and must be supplemented by Dragons and LAWs ([Figure 3-43](#)). Dragon and LAW positions should be placed where they can support the BFV but must not attract enemy attention to the BFV location. Dragons and LAWs are much more effective against the flanks, rear, and tops of threat armored vehicles and should be positioned to attack those areas. The TOWs should be conserved and employed against threat tanks as their primary target.

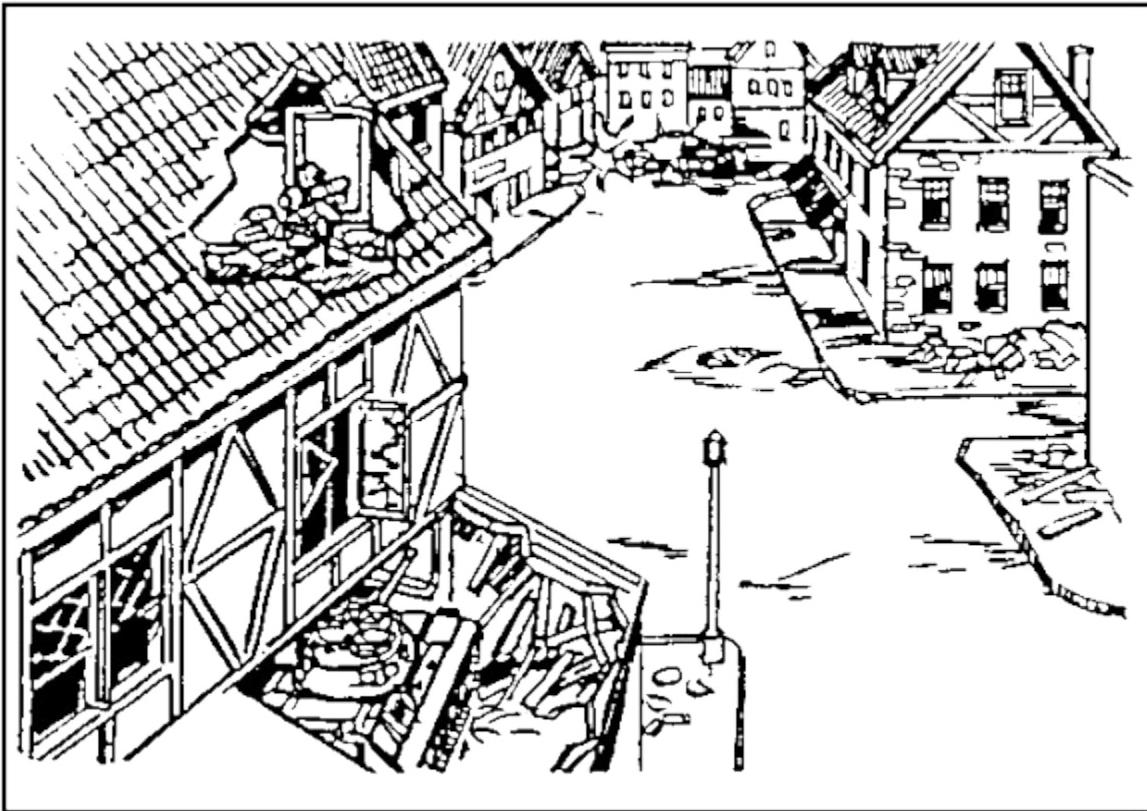


Figure 3-43. Dragon position supporting BFV.

4. Bradley-Equipped Echo Company. The Chief of Staff of the Army approved the replacement of the M901 ITV with the BFV in mechanized infantry battalions. While this change provides a much greater improvement in mobility, survivability, and fire-power over the M901, the basic mission of the Echo Company remains the same. (For more information on the employment of the Bradley-equipped Echo Company [BFV E CO], see [FM 7-91](#) and Change 1 to [FM 71-2](#).)

a. Considerations.

- (1) Due to the lack of a dismounted element, the Bradley-equipped Echo Company must rely on attached and or supporting dismounted infantry to provide local security.
- (2) It should be employed at the very least in sections or pairs (the wingman concept). This provides for some degree of mutual support.
- (3) The Bradley-equipped Echo Company consumes slightly more fuel than a M901 ITV company. This does not present much of a problem since the additional fuel requirements easily fall within the battalion's organic fuel hauling capacity.

b. Defensive Employment.

- (1) The vehicles should have multiple firing positions. The Bradley-equipped Echo Company commander can control the massing of long-range anti-armor fires into the battalion's area(s) by firing from several directions at once. This has two major effects: the enemy's ability to maneuver his mechanized infantry and armored forces will be

destroyed and or degraded; and the survivability of the Bradley-equipped Echo Company's vehicles and crews will be greatly enhanced.

- (2) The Bradley-equipped Echo Company, teamed with an armor counterattack unit, can suppress or destroy enemy ATGMs so the armor unit may decisively maneuver.
- (3) As with offensive operations, the Bradley-equipped Echo Company can conduct guard and screening operations.
- (4) The Bradley-equipped Echo Company can also conduct counter-reconnaissance operations to deprive the enemy of information about the friendly forces' disposition and composition.

Lesson 3

Practice Exercise 3-2

Instructions The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

1. Which one of the following is not provided by Combat Support?
 - A. Air cavalry.
 - B. Air defense.
 - C. Electronic warfare.
 - D. Military Police.
2. The 155-mm howitzer can penetrate 36 inches of concrete when used in the direct fire mode. At what range is this achieved?
 - A. At ranges up to 2,200 meters.
 - B. At a range of 3,200 meters.
 - C. At a range of 3,500 meters.
 - D. At a range of 4,200 meters.
3. Mortars should not be mounted directly on concrete; however, sandbags may be used as a buffer. How are these sandbags used?
 - A. Sandbags should consist of one layer, butted against a curb or wall.
 - B. Sandbags should consist of two or three layers; be butted against a curb or wall; and extended at least one sandbag width beyond the baseplate.
 - C. Sandbags should consist of four layers; be butted against a curb or wall; and extended at least two sandbags width beyond the baseplate.
 - D. The sandbags should consists of one layer, extended at least one sandbag width beyond the baseplate.
4. When considering tactical air support (Air Force), which air craft is the air weapons platform of choice?
 - A. A-10 (Thunderbolt).
 - B. AC-130.
 - C. F-4 (Phantom).
 - D. F-15 (Eagle).

5. Which one of the following best describes this statement: "Several spaces large enough for helicopter operations normally can be found within 2 kilometers of a city's center."
 - A. Air assaults.
 - B. Air movement of troops and supplies.
 - C. Large-scale assaults.
 - D. Small-scale assaults.
6. During fighting in built-up areas, who will perform most engineer manual-labor tasks?
 - A. Civilian volunteers.
 - B. EPWs.
 - C. Infantry units.
 - D. Prisoners from local prisons.
7. Although machine guns should be emplaced at the lowest level possible, grazing fire at ground level is often obstructed by
 - A. friendly forces.
 - B. heavy cloud cover (fog).
 - C. rubble.
 - D. smoke.
8. Since 1975, extensive tests have shown that the most serious hazard that can be expected from firing light and medium recoilless weapons while inside a masonry building is
 - A. hearing loss.
 - B. serious injury to personnel caused by flying debris.
 - C. substantial degradation occurs to the operator's tracking performance as a result of obscuration or blast over-pressure.
 - D. the building falling down on the crew.
9. In addition to the destructive effect on the enemy, a commander should consider using flamethrowers at night for
 - A. illumination of the battlefield.
 - B. marking targets, lanes, etc.
 - C. psychological effects.
 - D. signalling.

10. Why are BFVs and tanks not employed alone?

- A. Because BFVs and tanks provide critical fire support for the rifle teams.
- B. The buddy system works well for vehicles.
- C. Their observation overlaps.
- D. The task force commander wants it that way.

Practice Exercise 3-2

Answer Key and Feedback

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COMBAT SERVICE SUPPORT AND LEGAL ASPECTS OF COMBAT

During combat in built-up areas, the terrain and the nature of operations create unique demands on the battalion CSS system. Increased ammunition consumption, high casualty rates, transportation difficulties resulting from rubble, and the decentralized nature of operations all challenge the battalion CSS operators and planners. The solutions to these problems require innovative techniques and in-depth planning.

COMBAT SERVICE SUPPORT

Combat in built-up areas presents a different set of problems, but the supply and movement operations of the support platoon change minimally. The guidelines and principal functions of CSS are explained in this lesson.

1. Guidelines. Guidelines for providing effective CSS to units fighting in built-up areas are explained in this paragraph.

- a. Provide supplies to using units in the required quantities as close as possible to the location where those supplies are needed.
- b. Protect supplies and CSS elements from the effects of enemy fire by both seeking cover and avoiding detection.
- c. Disperse and decentralize CSS elements with proper emphasis on communication, command and control, security, and proximity of main supply route (MSR) for re-supply.
- d. Plan for the use of carrying parties and litter bearers.
- e. Plan for and use host country support and civil resources when authorized and practical.
- f. Position support units as far forward as the tactical situation permits.
- g. Plan for requesting and arranging special equipment such as the M202 FLASH, toggle ropes and grappling hooks, ladders, and so on.
- h. Position support units near drop or landing zones for re-supply from corps to forward units to reduce surface movement.

2. Principal Functions. The principal functions of CSS in built-up areas are to arm, fuel, fix, and man the combat systems.

- a. **Arm**. Combat in built-up areas is characterized by extremely high ammunition expenditure rates. Not only do individual soldiers fire more, but they also use more munitions such as smoke, concussion, and fragmentation grenades; LAWs; AT4s; Claymore mines; and demolitions. The ammunition consumption rate for the first day of combat in a built-up area can be up to four times the normal rate. Even though it decreases during succeeding days, consumption remains high. Commanders and S4s must plan to meet these high consumption rates. The plan must include how ammunition and demolitions are to be moved forward to the

companies. BFVs and M113 APCs may have to be allocated for the movement of ammunition if rubble or glass prevents wheeled-vehicle traffic. Carrying parties may also have to be used if streets are blocked by rubble.

b. Fuel. The amount of bulk fuel needed by a battalion during combat in built-up areas is greatly reduced. Combat vehicles normally use less fuel in built-up areas, because they travel shorter distances and perform less cross-country traveling. Engineer equipment and power generation equipment may use more fuel but requirements are small. A company may not use much fuel daily, but when it does need fuel, a problem exists in delivering bulk fuel to the vehicle. In open terrain, a vehicle has run out of fuel can be recovered later. But in built-up areas, the same vehicle is probably going to be lost quickly. Commanders and S4s must plan and provide the means of moving limited amounts of bulk fuel forward to combat units.

c. Fix. Maintenance teams must operate well forward to support units fighting in built-up areas. Although some maintenance operations may be consolidated in civilian facilities, many vehicles will have to be fixed near the fighting positions. Battle damage assessment and repair (BDAR) procedures allow mechanics to be inventive and make maximum use of battlefield damage, analysis, and repair techniques to return damaged vehicles to a serviceable conditions.

- (1) Combat in built-up areas generates a high demand for tires.
- (2) The dust and rough handling characteristic of combat in built-up areas also places strains on communication and night observation devices.
- (3) The unit armorers and their small-arms repair kits provide only limited maintenance. S4s should plan for increased weapon maintenance demands and coordinate maintenance support from higher headquarters. Based on recommendations from the staff (S3, S4, motor officer), the commander may choose to consolidate and cross-level major items of equipment and weapons.

d. Man. Units conducting combat in built-up areas must expect high casualty rates. According to the factors outlined in FM 101-10-1, Volume 2, units in the defense may experience a casualty rate of 3.5 percent on the first day and 1.9 percent each successive day. Casualty feeder reports must be prepared scrupulously and forwarded to the battalion personnel and administration center (PAC).

- (1) The S1 with medical platoon leader must plan to expedite the evacuation of wounded out of the built-up area. Forward aid station locations and evacuation routes must be planned and disseminated to the lowest level. Higher casualty rates should be expected and may require the stockpiling of medical supplies and augmentation of medical personnel from higher headquarters.
- (2) The battalion PAC should process replacements quickly and transport them to their new unit. The battalion PAC is responsible for reviewing assignment orders, welcoming soldiers to the battalion, assigning soldiers IAW commanders priorities, obtaining personal information, and collecting medical records and forwarding them to the aid station. It is also responsible for adding names to the battle roster, preparing Standard

Installation/Division Personnel System (SIDPERS) input for each one, and processing the names into the servicing postal activity. The S1 and PAC should brief the new soldiers on the tactical situation, provide mess and medical support as needed, inspect for combat critical equipment shortages, and coordinate transportation to units. Replacements should be brought forward from the field trains with the logistics package (LOGPAC) and linked up with their new unit's first sergeant. If replacements are brought forward at unscheduled times, the logistic release point (LRP) should still be used as the linkup point.

(3) Proper accountability of platoon personnel and accurate strength reporting are essential to support decision making by platoon leaders, company commanders, and the battalion commander. Using battle rosters, leaders in the platoon maintain accurate, up-to-date records of their personnel. At periodic intervals, they provide strength figures to the company CP. During combat, they provide hasty strength reports on request or when significant changes in strength occur.

(4) By-name casualty information is reported by wire or by messenger to company headquarters during lulls in the tactical situation. This information should not be transmitted by radio since it could adversely affect unit morale, and the enemy could gain valuable information. Soldiers having direct knowledge of an incident complete a DA Form 1155 to report missing or captured soldiers, or casualties no longer under US control. (See AR 600-8-1 for instructions on how to complete this form.) DA Form 1156 is used to report soldiers who are killed or wounded. (See AR 600-10 for instructions on how to complete this form.) After being collected and reviewed for accuracy by the platoon leader or platoon sergeant, these forms are forwarded to the company headquarters. These forms provide important casualty information and are also used to determine the platoon's replacement requirements.

(5) The S1 must coordinate with the S3 or S4 for the transport of replacements over long distances, and for the issue of missing individual combat equipment. At night, replacements may need to be sent forward with guides to their new unit. These groups may be used to carry critical supplies and ammunition forward.

(6) The S1 must be prepared to deal with not only physical wounds but also psychological wounds.

(a) Prolonged combat in built-up areas generates incredible stress. Some soldiers show signs of inability to cope with such stress. Stress management is the responsibility of commanders at all levels. The S1 coordinates trained personnel, such as medical personnel and unit ministry team personnel, to support units when the situation dictates.

(b) The more intense the combat, the higher the casualties; the more extreme the weather, the longer the battle lasts; the more combat exhaustion and stress, the more casualties.

(c) The S1 should plan to provide the soldier with a short rest period in a protected section of the battalion rear area, along with warm food and hot liquids. He should take this opportunity to give the soldier command information products (obtained through public affairs channels). These inform the soldier of the larger picture of the battle, the theater of operations, the Army, and the welfare of the nation as a whole. As a result of treating stress problems in the battalion area, a higher percentage of stress casualties can be returned to duty than if they had been evacuated farther to the rear. When recovered, they should be returned to their original units the same as all hospital returnees.

3. **Supply and Movement Functions**. The S4, support platoon leader, and battalion motor officer share the responsibility for coordinating all supply and movement functions within the battalion. The use of pre-configured LOGPACs that are pushed forward to the elements in contact will be the key to successful re-supply operations. The support platoon contains the trucks and trained drivers needed to move supplies forward. Some classes of supply, and how they are moved, may assume greater importance than during combat outside the city or village.

a. **Class I (Rations)**. The process of ordering and moving rations to the battalion's forward positions is complicated by the dispersed nature of combat in built-up areas and its increased caloric demands on soldiers. The battalion mess section must try to provide a hot meal.

(1) Combat in built-up areas not only causes great stress on soldiers but also requires great physical exertion. This combination of stress and exertion quickly causes dehydration. Unless potable water is continuously provided, soldiers seek local sources, which are usually contaminated by POL runoff, sewage, bacteria, or unburied corpses. Soldiers who are not provided sufficient quantities of potable water become casualties due to drinking from contaminated sources or from dehydration. Waterborne contaminants can quickly render entire units combat-ineffective.

(2) Water and other liquid supplements, such as coffee, tea, or soup, that must be forwarded to exposed positions may need to be backpacked at night.

b. **Class II (General Supplies)**. Combat in built-up areas places a great strain on combat uniforms and footgear. The battalion S4 should increase his on-hand stocks of uniforms, boots, and individual combat equipment such as protective masks and armored vests. NBC protection suits either tear or wear out quickly when worn in the rubble, which is typical of combat in built-up areas. Extra stocks of these and protective mask filters should be kept on hand. Limited amounts of other Class II and IV items may be available locally. These should be gathered and used if authorized and practical. Local shops may provide such items as hand tools, nails, bolts, chains, and light construction equipment, which are useful in preparing a defense or reducing enemy-held positions. The unit's organic wire communications net may be augmented with locally obtained telephone wire and electrical wire.

c. **Class III (POL)**. Bulk fuel may have to be brought forward from fuel tankers by use of 5-gallon cans. One man can carry a fuel can long distances, even over rubble, if it is lashed to a pack frame. Supplies of bulk Class III items and some pre-packaged POL may be available at

local gas stations and garages. These may be contaminated or of poor quality. The S4 should coordinate with the brigade S4 to have a fuel test performed by a qualified member of the supporting final staging base (FSB) or forward area support team (FAST).

d. **Class IV (Barrier Materials).** If a unit is defending a built-up area, the required class IV materials are less than in other areas. This class of supply is probably the most available locally. After coordinating the effort with higher headquarters, the S4, support platoon leader, and supporting engineer officer can gather materials for use in strengthening a defense. Cargo trucks from the support platoon, wreckers or recovery vehicles from the maintenance platoon, and engineer construction equipment can be used to load and move barrier materials. Normally, division- or corps-level assets bring Class IV materials forward. Defense of a built-up area may require concertina wire and or barbed wire to restrict the enemy infantry's movements. Barriers can be built of abandoned cars and buses, which are dragged into position, turned on their sides, and chained together through the axles.

e. **Class V (Munitions).** Combat in built-up areas causes ammunition to be expended at extremely high rates. Commanders should plan for early resupply of explosives, grenades, and ammunition for small arms, direct fire, and indirect fire weapons.

(1) In the defense, the S4 should pre-stock as much ammunition as practical in dispersed storage areas. These storage areas should be protected and be of easy access from the forward defensive positions.

(2) Commanders and S4s must plan to continuously deliver ammunition to the leading elements as they advance. This may be carried by armored vehicles close behind the advancing troops or by designated carrying parties. Modern ammunition, particularly missiles, is characterized by extensive amounts of packing material. The S4 must plan to have an element remove the ammunition depot overpack before it is transported forward. Re-supply by helicopter (prepackaged slingloads) may be feasible.

(3) Removing the overpack from large amounts of ammunition can be a time-consuming. It may require the efforts of the entire support platoon, augmented by available soldiers. If carrying parties are used to move ammunition forward, an individual can carry about 75 to 90 pounds using a pack frame or rucksack. Bulky and heavier loads can be carried by lashing them to litters and using teams of two to four men. Loads up to 400 pounds can be carried moderate distances using four-man teams.

NOTE: **DO NOT use aidmen to carry ammunition forward as described above--it is a violation of the Geneva Accords.**

f. **Class VIII (Medical Supplies).** Due to the decentralized nature of combat in built-up areas, medical supplies should be dispersed throughout the battalion, not just consolidated with the aid station and the individual aidmen. Individual soldiers, especially trained combat lifesavers, should carry additional bandages, cravats, and intravenous sets. Companies should request additional splints and stretchers.

4. Medical. The battalion surgeon, physician's assistant, and medical platoon leader are responsible for planning and executing medical functions within the battalion. The most critical functions during combat in built-up areas include preventive medicine, trauma treatment, and evacuation. In addition, there should be a plan for the treatment and evacuation of NBC-related casualties that would occur in combat in built-up areas.

- a. Combat in built-up areas exposes soldiers not only to combat wounds but also to the diseases endemic to the area of operations. Commanders must enforce prevention measures against the spread of infectious diseases. The medical platoon advises the commander on how best to implement the use of prophylactics.
- b. Although the aid man normally attached to each rifle platoon is the soldier best trained in the treatment of traumatic injury, he can quickly become overwhelmed by the number of casualties needing care. The commander must train selected soldiers within the platoons to perform basic trauma treatment. The work of these combat lifesavers, plus the buddy-aid efforts of individual soldiers, eases the burden of the aid man and allows him to concentrate on the seriously wounded. The medical platoon should plan to care for the mass casualties inherent in combat in built-up areas. The incidence of crushing injuries, eye injuries, burns, and fractures increases.
- c. The difficulties encountered when evacuating casualties from urban terrain are many and require innovative techniques and procedures. The planning for medical evacuation in urban terrain must include special equipment requirements, use of litter teams, use of air ambulances and the rescue hoist, use of the ambulance shuttle system, and communications requirements and techniques for locating casualties.
 - (1) Special equipment requirements include ropes, pulleys, sked litters, axes, crowbars, and other tools used to break through barriers.
 - (2) Although litter teams are labor intensive, they are required for evacuation from buildings, where casualties can occur at any level. Also, rubble in the streets, barricades, and demolition of roads impede the use of ground ambulances, requiring a heavy reliance on litter teams. The medical personnel assigned to the unit must dismount from the ambulance, and search for and rescue casualties. However, there are not sufficient medical assets to accomplish the evacuation mission, requiring assistance from the supported units.
 - (3) Air ambulances equipped with the rescue hoist may be able to evacuate casualties from the roofs of buildings or to insert medical personnel where they are needed. The vulnerability to sniper fire must be considered and weighed against probable success of the evacuation mission. Also, pilots must be familiar with overflying built-up areas and the atmospheric conditions they may encounter. Air ambulances can also be used at secured ambulance exchange points to hasten evacuation time.
 - (4) An ambulance shuttle system with collecting points, ambulance exchange points (AXPs), and relay points must be established. The battalion aid station may be located in a park or sports arena within the city's boundaries, or outside the built-up area. In either

case, the existence of rubble and other obstructions hamper the mobility and accessibility of the treatment element. By establishing an ambulance shuttle system, the distance required to carry casualties by litter teams is shortened. This also allows personnel familiar with the area to remain in that area and to continue their search, rescue, recovery, and evacuation mission. By pre-designating collecting points, soldiers who are wounded but still ambulatory can walk to these points, hastening the evacuation effort.

(5) The area of communications presents one of the biggest obstacles to casualty evacuation. Due to the terrain, line of sight radios are not effective. Also, individual soldiers normally do not have access to radios. Therefore, when wounded within a building, a soldier may be difficult to find and evacuate. The unit SOP should contain alternate forms of communications such as colored panels or other forms of markers that can be displayed to hasten rescue when the battle is over. Also, a systematic search of the area after the battle may be required to recover casualties.

d. The use of local medical facilities, hospitals, professional medical help, and medical supplies may be available during combat in large built-up areas. The commander must adhere to the guidelines established within the theater as to when and how these facilities can be used. If civilians are wounded in the battalion area, the commander is responsible for providing them aid and protection without disrupting military operations. A commander cannot confiscate civilian medical supplies unless he makes provisions to provide adequate replacements if civilians are wounded.

e. The commander is responsible for the evacuation of deceased personnel to the nearest mortuary affairs collection point, whether they are US, allied, enemy, or civilian. (See FM 10-63 and FM 10-497 for specific information on the handling of deceased personnel.) Some general considerations for the handling of deceased personnel include:

- (1) The Theater commander is the approval authority for hasty burial.
- (2) The deceased person's personal effects must remain with the body to assist in the identification of the body and to facilitate shipment of personal effects to the next of kin. Retention of personal items is considered looting and is, therefore, punishable by UCMJ.
- (3) When operating under NBC conditions, the bodies of deceased personnel should be decontaminated before removal from contaminated areas to prevent further contamination and casualties.
- (4) Care must be exercised when handling deceased personnel. Improper handling of deceased personnel can result in a significant decrease in unit and civilian morale.

5. **Personnel Services.** Timely and accurate personnel services are just as important during combat in built-up areas as in any other operation. The close, intense, isolated fighting places great stress on the soldier.

a. The S1 plans for all personnel services that support and sustain the morale and fighting spirit of the battalion. Among the most important of these services are:

- (1) Religious support.
- (2) Postal services.
- (3) Awards and decorations.
- (4) Rest and recuperation.
- (5) Replacement operations.
- (6) Strength accounting.
- (7) Casualty reporting.
- (8) Finance support.
- (9) Legal support and services.
- (10) Public Affairs activities.

b. A unit may lose a battle if it allows civilians to steal or destroy its equipment. Even friendly civilians may steal supplies or furnish intelligence to the enemy. Civilians should be evacuated, if possible, to prevent pilferage, sabotage, and espionage. Control of the civilian population is normally provided by military police and civil affairs units. Collection points for noncombatants are established in rear areas. The S1 is the battalion's link to the population control programs of the higher command.

LEGAL ASPECTS OF COMBAT

Commanders must be well educated in the legal aspects of combat in built-up areas that include the control of large groups of civilians, the protection of key facilities, and civil affairs operations.

1. Civilian Impact In The Battle Area. The presence of large concentrations of civilians can greatly impede tactical operations. Civilians attempting to escape from the battle area may have the following impact on military operations:

- a. **Mobility**. Fleeing civilians, attempting to escape over roads, can block military movement. Commanders should plan routes to be used by civilians and should seek the assistance of the civil police in traffic control.
- b. **Firepower**. The presence of civilians can restrict the use of potential firepower available to a commander. Areas may be designated no-fire areas to prevent civilian casualties. Other areas may be limited to small-arms fire and grenades with prohibitions on air strikes, artillery, mortars, and flame. Target acquisition and the direction of fire missions are complicated by the requirement for positive target identification. Detailed guidance on the use of firepower in the presence of civilians is published by the division G3. In the absence of guidance, the general rules of the law of land warfare apply.
- c. **Security**. Security should be increased to preclude:

- (1) Civilians being used as cover by enemy forces or agents.
- (2) Civilians wandering around defensive areas.
- (3) Pilferage of equipment.
- (4) Sabotage.

d. **Obstacle Employment.** The presence of local civilians and movement of refugees influence the location and type of obstacles that may be employed. Minefields may not be allowed on designated refugee routes or, if allowed, must be guarded until the passage of refugees is completed. Booby traps and flame obstacles cannot be emplaced until civilians are evacuated.

2. Command Authority. The limits of authority of commanders at all levels over civilian government officials and the civilian populace must be established and understood. A commander must have that degree of authority necessary to accomplish his mission. However, the host government's responsibility for its populace and territory can affect the commander's authority in civil-military matters. In less secure areas, where the host government may be only partly effective, the commander may be called upon to assume greater responsibility for the safety and well being of the civilian populace.

3. Source Utilization. Operations in highly populated areas require the diversion of men, time, equipment, and supplies to accomplish humanitarian tasks. If host government agencies collapse, the impact on military resources could be substantial.

4. Health And Welfare. The disruption of civilian health and sanitary services sharply increases the risk of disease among both civilian and military personnel.

5. Law And Order. The host government may not be able to control mobs. US forces may have to augment civilian forces to protect life and property and to restore order. US forces may also have to secure vital government facilities for the host nation. (For more information on how to control civilians violating civil law, see [FM 9-15](#).)

6. Public Affairs Officer And Media Relations. The best way to relate the Army's story is through the media. While free access to units in the field is desirable, operational security, existing guidelines, and rules of engagement considerations take the first priority. All members of the media visiting the field should have an escort officer. This officer may be detailed from line units due to the shortage of trained public affairs personnel. Ensuring the media follows the established guidelines or rules of engagement will help prevent negative publicity that could jeopardize the operation or US national objectives. If operations permit, the battalion should also appoint a representative to serve as a point of contact with the local population to deal with their concerns (usually maneuver damage).

7. Civil Affairs Units And Psychological Operations. Civil affairs units and psychological operations have prominent and essential roles in MOUT. They are critical force multipliers that can save lives. The battle in urban terrain is won through effective military operations, but PSYOP and CA can make that victory more easily attained. In an ideal setting, PSYOP and CA offer the possibility of victory in an urban setting without the destruction, suffering, and horror of battle. They should be included in any study of MOUT. Civil affairs units are normally placed in support of units to assist and conduct CA operations.

- a. The primary responsibility of the S5 (Civil-Military Operations) in MOUT is to coordinate activities necessary for the evacuation of civilians from the battle area. This is accomplished in two separate but supporting actions.
 - (1) CA personnel coordinate with the military police and local police officials for evacuation planning. They plan for establishing evacuation routes and thoroughfare crossing control, and for removing civilians from the military supply routes (MSRs).
 - (2) CA personnel coordinate with US Army PSYOP assets, local government officials, radio and television stations, newspapers, and so on, to publicize the evacuation plan.
- b. The civil military operations officer also has the responsibility to advise the commander concerning his legal and moral obligations to the civilian population. This requirement can be fulfilled by CA assets conducting coordination for the health and well being of civilians. It can include the reestablishment of water systems; distribution of available food stocks, clothing, and medical supplies; and establishment of displaced persons, refugee, and evacuee (DPRE) camps.
- c. If the civil government is not functioning because of battlefield devastation, it is the commander's responsibility to conduct evacuation planning and to provide for the well being of the civilian population. He must do this with only those internal assets available. Because of foreign sovereignty and the utilization of all available host nation assets, this should only be used as a last resort.
- d. Tactical PSYOP in support of MOUT operations are planned and conducted in combat areas to achieve immediate and short-term objectives. PSYOP are an integral and coordinated part of the overall tactical plan. They provide the tactical commander with a system that can weaken the enemy soldier's will to fight, thereby reducing his combat effectiveness. They can also help prevent civilian interference with military operations. PSYOP are designed to exploit individual and group weaknesses.
- e. Psychological operations units provide support in MOUT using television, radio, posters, leaflets, and loudspeakers to disseminate propaganda and information. Television, including video tapes, is one of the most effective media for persuasion. It offers many advantages for PSYOP and is appropriate for use in a limited, general, or cold war. In areas where television is not common, receivers may be distributed to public facilities and selected individuals.

NOTE: See FM 51-5 and [FM 41-10](#) for further discussion on civil affairs.

- 8. Provost Marshal. The provost marshal recommends measures required to control civilians and directs military police activities in support of refugee control operations. The provost marshal coordinates his activities with the staff sections and supporting units in the area. Refugee control operations are the responsibility of the G5 or S5, host nation authorities, or both. MPs assist, direct, or deny the movement of civilians whose location, direction of movement, or actions may hinder operations. The host nation government is responsible for identifying routes for the safe movement of refugees out of an area of operations.

NOTE: **Other military police responsibilities, regarding civil affairs and civilian control, are contained in FM 19-1.**

9. **Commander's Legal Authority And Responsibilities.** Commanders and leaders at all levels are responsible for protecting civilians and their property to the maximum extent allowed by military operations. Looting, vandalism, and brutal treatment of civilians are strictly prohibited, and individuals who commit such acts should be severely punished. Civilians, and their religions and customs, must be treated with respect. Women must be especially protected against any form of abuse. In urban fighting, however, some situations are not quite so explicit as the above rules imply. Discussed herein are those civilian-military confrontations most common in built-up areas and how an infantry commander might manage them to legally accomplish his mission.

a. **Control Measures.** Commanders may enforce control measures to conduct operations, maintain security, or ensure the safety and well-being of the civilians.

(1) **Curfew.** A commander with the mission of defending a town could establish a curfew to maintain security or to aid in control of military traffic. However, a curfew would not be legal if imposed strictly as punishment.

(2) **Evacuation.** A commander can require civilians to evacuate towns or buildings if the purpose of the evacuation is to use the town or building for imperative military purposes, to enhance security, or to safeguard those civilians being evacuated. If a commander takes this action, he must specify and safeguard the evacuation route. Food, clothing, and sanitary facilities should be provided at the destination until the evacuees can care for themselves.

(3) **Forced labor.** The Geneva Accords prohibit the use of civilians in combat. However, they may be used before the battle reaches the city. Guidelines for use of civilian labor should be published by the division G5. The commander may force civilians over 18 years of age to work if the work does not oblige them to take part in military operations. Permitted jobs include maintenance of public utilities as long as those utilities are not used in the general conduct of the war. Jobs can also include services to local population such as care of the wounded and burial. Civilians can also be forced to help evacuate and care for military wounded, as long as doing so does not involve any physical danger. Prohibited jobs include digging entrenchments, constructing fortifications, transporting supplies or ammunition, or acting as guards. Volunteer civilians can be employed in such work.

b. **Civilian Resistance Groups.** Another situation that commanders might encounter is combat with a civilian resistance group.

(1) Civilians accompanying their armed forces with an identity card authorizing them to do so, are treated as EPWs when captured - for example, civilian members of military aircraft crews, war correspondents, supply contractors, and members of labor units or of service organizations responsible for the welfare of the armed forces.

(2) Civilians of a non-occupying territory who take up arms against an invading enemy without time to form regular armed forces; wear a fixed, distinctive insignia that can be seen at a distance; carry their weapons openly; and operate according to the rules and customs of warfare are treated as EPWs when captured. Other civilians who provide assistance to such groups may not be entitled to status as combatants, depending upon whether they are actually members of the resistance group. They are normally best treated as combatants until a higher authority determines their status.

(3) Armed civilian groups that do not meet the criteria of a legal resistance (civilians accompanying their armed forces and levee en masse) or individuals caught in the act of sabotage, terrorism, or espionage are not legal combatants. If captured, they must be considered criminals under the provisions of the law of land warfare. They should be detained in a facility separate from EPWs and should be quickly transferred to the military police. Reprisals, mass punishments, taking of hostages, corporal punishment, pillage, or destruction of property are prohibited punishments.

(4) The law of land warfare lets a commander control the civil population under the conditions already described using his own resources. However, language and cultural differences between US and foreign personnel make it good practice to use native authorities, such as the police, for such purposes. Use of the police does not relieve a commander of his responsibility to safeguard civilians in his area.

c. **Protection of Property.** Like civilian personnel, civilian buildings and towns normally have a protective status - for example, they are not legal targets. Buildings and towns lose their protected status if authorities determine that the enemy is using them for military purposes. If doubt exists as to whether a town or building is defended, that doubt should be settled by reconnaissance - not by fire.

(1) If the enemy is using a building or a portion of the town for military purposes - for example, as a supply point or a strongpoint - that building or that portion of the town is a legal target. Before engaging the target, the commander must decide if the bombardment of the target is necessary. Only such destruction as is required for military purposes is justified.

(2) Normally, religious, historical, and cultural objects and buildings are not legal targets. They are sometimes marked with symbols to signify cultural objects. Medical facilities are protected under the internationally recognized Red Cross, Red Crescent, Red Lion, or Red Star of David symbols. The fact that such symbols are absent does not relieve a commander of his responsibility to protect objects he recognizes as having religious, cultural, medical, or historical value.

(3) The misuse of such objects by the enemy is grounds to disregard their protected status. Whenever possible, a demand should be made for the enemy to stop his misuse of the protected object within a reasonable time. If an enemy forward observer uses a church for an OP, for example, a commander would be justified in destroying it immediately, because a delay would allow the enemy to continue the misuse of the

church. If a religious shrine was used as a telephone switchboard, a warning would be appropriate, since it would take some time to dismantle the wires. Once the decision to call fires on those objects is reached, destruction should be limited to the least necessary to neutralize the enemy installations.

(4) The destruction, demolition, or military use of other buildings is permitted under the law of land warfare, if required by clear military necessity. Thus, destroying a house to obtain a better field of fire would be a legal act - destroying it as a reprisal would not be. Likewise, firing on any houses that are occupied or defended by an enemy force is legal.

Lesson 3

Practice Exercise 3-3

Instructions The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

1. Which of these are the correct principal functions of CSS in a built-up area?

- A. Arm, find, fix, and provide needed services.
- B. Arm, fuel, fix, and man the combat systems.
- C. Provide, fix, feed, and support the front.
- D. Fix, fuel, replace, and man the combat systems.

2. Which of the classes listed below provide replacement protective masks?

- A. Class I.
- B. Class II.
- C. Class III.
- D. Class IV.

3. As part of the defensive scheme, you must request material to build a barrier around your sector. Which of these Classes will support this effort?

- A. Class II.
- B. Class III.
- C. Class IV.
- D. Class V.

4. Due to the intense fighting, some civilians have become casualties. What is done with wounded civilians?

- A. Don't touch them, inform the civilian authorities.
- B. Evacuate-the wounded to a civilian hospital.
- C. Send for a civilian doctor to treat them.
- D. They are provided with aid and protection as long as it doesn't disrupt military operations.

5. Who has the approval authority for a hasty burial?

- A. The company commander.
- B. The medical doctor on site.
- C. The platoon leader.
- D. The Theater commander.

Practice Exercise 3-3

Answer Key and Feedback

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LESSON 4

MILITARY OPERATIONS ON URBAN TERRAIN (DEFENSE)

OVERVIEW

LESSON DESCRIPTION:

In this lesson you will learn to perform a specific task required in planning for and conducting a defensive operation on urbanized terrain.

TERMINAL LEARNING OBJECTIVE:

ACTION: Explain U.S. doctrine on planning a MOUT defense.

CONDITION: Given extracts of doctrinal literature, a tactical situation for a battalion TF S3, and a series of multiple-choice questions relating to Threat force offensive doctrine.

STANDARD: To demonstrate competency of the task, you must achieve a minimum of 70% on the subcourse examination.

REFERENCES: The material contained in this lesson was derived from the following publications: [FM 34-130](#), [FM 90-10-1](#), and FM 100-2-2.

INTRODUCTION

Of the two patterns of defense, area and mobile, the area defense is the pattern most used since most of the reasons for defending a city are focused on retaining terrain. The mobile defense pattern is more focused on the enemy and the commander may decide to use it based on his estimate of the situation. In a built-up area, the defender must take advantage of the abundant cover and concealment. He must also consider restrictions to the attacker's ability to maneuver and observe. By using the terrain and fighting from well-prepared and mutually supporting positions, a defending force can inflict heavy losses on, delay, block, or fix a much larger attacking force.

DEFENSIVE CONSIDERATIONS

A commander must decide whether defending a built-up area is needed to successfully complete his mission. Before making his decision, the commander should consider the issues discussed herein.

1. Reasons for Defending Built-Up Area. A commander should consider reasons for defending built-up area.

a. Certain built-up areas contain strategic industrial, transportation, or economic complexes that must be defended. Capitals and cultural centers can be defended for strictly psychological or national morale purposes even if they do not offer a tactical advantage to the defender. Because

of the sprawl of such areas, significant combat power is required for their defense. Thus, the decision to defend these complexes is made by political authorities or the theater commander.

- b. The defender's need to shift and concentrate combat power, and to move large amounts of supplies over a wide battle area require that he retain vital transportation centers. Since most transportation centers serve large areas, the commander must defend all of the built-up area to control such centers.
- c. The worldwide increase in sprawling built-up areas has made it impossible for forces conducting combat operations to avoid cities and towns. Most avenues of approach are straddled by small towns every few kilometers and must be controlled by defending forces. These areas can be used as battle positions or strongpoints. Blocked streets covered by mortar and artillery fire can canalize attacking armor into mined areas or zones covered by anti-armor fire. If an attacker tries to bypass a built-up area, he may encounter an array of tank-killing weapons. To clear such an area, the attacker must sacrifice speed and momentum, and expend many resources. A city or town can easily become a major obstacle.
- d. Forces can be concentrated in critical areas. Due to the tactical advantages to the defender, a well-trained force defending a built-up area can inflict major losses on a numerically superior attacker. The defender can conserve the bulk of his combat power so that it is available for use in open terrain. The defenders remaining in built-up areas perform an economy-of-force role.
- e. Forces can be well concealed in built-up areas. Aerial photography, imagery, and sensory devices cannot detect forces deployed in cities. CPs, reserves, CSS complexes, and combat forces emplaced well in built-up areas make them hard to detect.

2. Reasons for not Defending Built-Up Areas. The commander should consider the following reasons for not defending built-up areas.

- a. The location of the built-up area does not support the overall defensive plan. If the built-up area is too far forward or back in a unit's defensive sector, is isolated, or is not astride an enemy's expected avenue of approach, the commander may not defend it.
- b. Nearby terrain allows the enemy to bypass on covered or concealed routes. Some built-up areas, mainly smaller ones, are bypassed by main road and highway systems. A built-up area that can be easily bypassed normally will be.
- c. Structures within the built-up area do not adequately protect the defenders. Extensive areas of lightly built or flammable structures offer little protection to the defenders. Built-up areas near flammable or hazardous industrial areas, such as refineries or chemical plants, may not be defended.
- d. Dominating terrain is close to the built-up area. If the built-up area can be dominated by an enemy force occupying close terrain, the commander may choose to defend from there rather than the built-up area. This applies mainly to small built-up areas such as a village.
- e. Better fields of fire exist outside the built-up area. The commander may choose to base all or part of his defense on the long-range fields of fire that exist outside a built-up area. This applies

mainly to armor-heavy forces defending sectors with multiple, small, built-up areas surrounded by farm areas.

f. The built-up area has cultural, religious, or historical significance. The area may have been declared an "open city," in which case, by international law, it is demilitarized and must be neither defended nor attacked. The attacking force must assume civil administrative control and treat the civilians as noncombatants in an occupied country. The defender must immediately evacuate and cannot arm the civilian population. A city can be declared open only before it is attacked. The presence of large numbers of noncombatants, hospitals, or wounded personnel may also affect the commander's decision not to defend a built-up area.

CHARACTERISTICS OF BUILT-UP AREAS

The defense of a built-up area should be organized around key terrain features, buildings, and areas that preserve the integrity of the defense and that provide the defender ease of movement. The defender must organize and plan his defense by considering obstacles, avenues of approach, key terrain, observation and fields of fire, cover and concealment, fire hazards, and communications restrictions.

1. Obstacles. A city itself is an obstacle since it canalizes and impedes an attack. Likely avenues of approach should be blocked by obstacles and covered by fire. Barriers and obstacles should be emplaced in three belts.

a. The first obstacle belt is at the nearest buildings across from and parallel to the main defensive position (MDP). This belt consists of wire and improvised barriers (to include inside buildings, in subterranean avenues of approach, and outside in open areas), danger areas, and dead space. These barriers and obstacles should be heavily booby trapped and covered by long-range fires as appropriate. This belt impedes enemy movement, breaks up and disorganizes attack formations, and inflicts casualties.

b. The second obstacle belt is placed between the first belt and the MDP buildings, but out of hand grenade range from defensive positions. It impedes movement, channelizes the enemy into the best fields of fire, breaks up attack formations, and inflicts casualties. This belt is not meant to stop enemy soldiers permanently. It should be constructed efficiently to give the most benefit - not to be an impenetrable wall. It consists mainly of wire obstacles, improvised barriers, road craters, and mine fields. It should be booby trapped heavily (including trip-wire-activated Claymores). Triple-strand concertina is placed along the machine gun final protective line (FPL) (as designated earlier with engineer tape) to slow the enemy on the FPL and allow the machine gun to be used effectively.

c. The third obstacle belt is the defensive positions denial belt. It consists of wire obstacles placed around, through, and in the defensive buildings and close-in mine fields as well as in subterranean accesses. It impedes and complicates the enemy's ability to gain a foothold in the defensive area. It should be booby trapped, and Claymores should be used extensively, both trip wire activated and command detonated. The booby traps and Claymores should be placed where they will not cause friendly casualties.

d. All avenues of approach (surface and subsurface) must be denied. Units must not overlook the use of field-expedient obstacles such as cars, light poles, and so on ([Figure 4-1](#)), or the emplacement of antipersonnel and antitank mines.

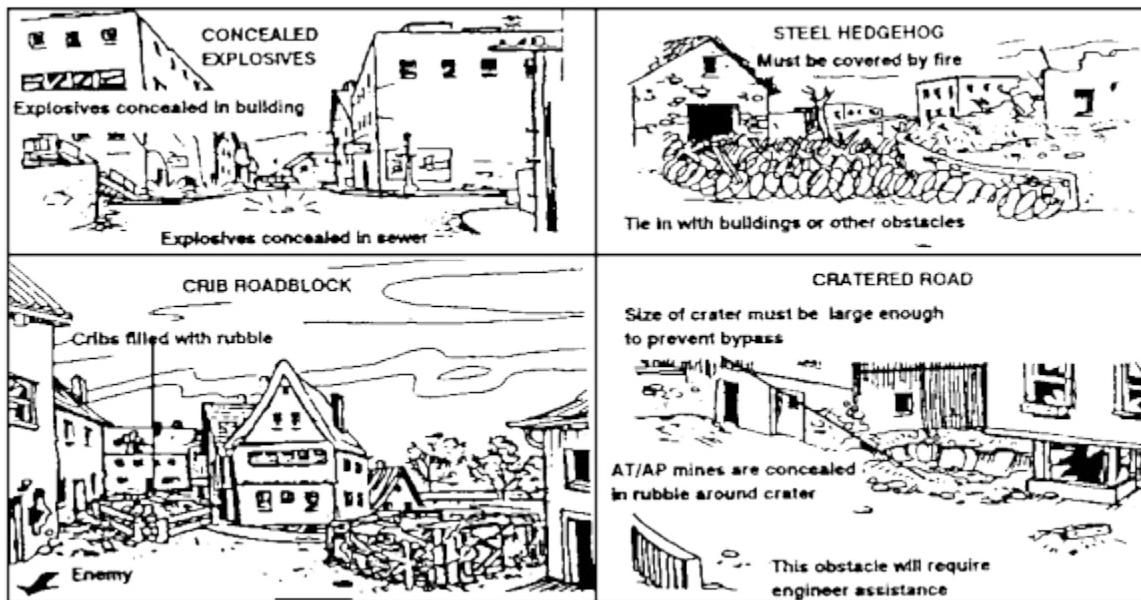


Figure 4-1. Example of field-expedient obstacles.

2. **Avenues of Approach.** The defender must not only consider the conventional avenues of approach into and out of the city but also the avenues within built-up areas that are above and below ground level. The defender normally has the advantage. He knows the city and can move rapidly from position to position through buildings and underground passages.

3. **Key Terrain.** Key terrain is any place where seizure, retention, or control affords a marked advantage to either enemy or friendly forces. Primary examples of key terrain are bridges over canals or rivers, building complexes, public utilities or services, or parks. Built-up areas are unusual in that the population of the area itself may be considered key terrain. The identification of key terrain allows the defender to select his defensive positions and assists in determining the enemy's objective.

4. **Observation and Fields of Fire.** The defender must position weapons to obtain maximum effect and mutual supporting fire. This allows for long-range engagements out to the maximum effective ranges. Artillery FOs should be well above street level to adjust fires on the enemy at maximum range. Fires and final protective fires (FPFs) should be pre-registered on the most likely approaches to allow for their rapid shifting to threatened areas.

5. Cover and Concealment.

a. The defender should prepare positions using the protective cover of walls, floors, and ceilings. Soldiers should always improve positions using materials at hand. When the defender must move, he can reduce his exposure by:

- (1) Using prepared breaches through buildings.
- (2) Moving through reconnoitered and marked underground systems.

(3) Using trenches and sewage systems.

(4) Using the concealment offered by smoke and darkness to cross open areas.

b. To accomplish his mission, the attacker must advance by crossing streets and open areas between buildings where he is exposed to fires from concealed weapons positions.

6. Fire Hazards. The defender's detailed knowledge of the terrain permits him to avoid areas that are likely to be fire hazards. All cities are vulnerable to fire, especially those with many wooden buildings. The defender can deliberately set fires:

- a. To disrupt and disorganize the attackers.
- b. To canalize the attackers into more favorable engagement areas.
- c. To obscure the attacker's observation.

7. Communications Restrictions. Wire is the primary means of communication for controlling the defense of a city and for enforcing security. However, wire can be compromised if interdicted by the enemy. Radio communication in built-up areas is normally degraded by structures and a high concentration of electrical power lines. The new family of radios may correct this problem, but all units within the built-up area may not have these radios. Therefore, radio is an alternate means of communication. Messengers can be used well as another means of communication. Visual signals may also be used but are often not effective because of the screening effects of buildings, walls, and so forth. Signals must be planned, widely disseminated, and understood by all assigned and attached units. Increased noise makes the effective use of sound signals difficult.

FACTORS OF METT-T

Procedures and principles for planning and organizing the defense of a built-up area are the same as for other defensive operations. In developing a defensive plan, the defender considers METT-T factors with emphasis on fire support, preparation time, work priorities, and control measures. Planning for the defense of a city must be detailed and centralized.

1. Mission. The commander must receive, analyze, and understand the mission before he begins planning. He may receive the mission as a FRAGO or formal OPORD, and must analyze all specified and implied tasks.

2. Enemy.

a. The commander must also analyze the type of enemy he may encounter. If the attacker is mostly dismounted infantry, the greatest danger is allowing him to gain a foothold. If the attacker is mostly armor or mounted motorized infantry, the greatest danger is that he will mass direct fire and destroy the defender's positions.

b. Intelligence gathering for defensive operations is not limited to only studying the enemy. Commanders must emphasize obtaining and using all intelligence. The items of intelligence peculiar to combat in built-up areas are discussed in lesson 1. They include:

(1) Street, water, and sewer plans.

- (2) Key installations and facilities.
- (3) Key civilians.
- (4) Civilian police and paramilitary forces.
- (5) Sources of food.
- (6) Communications facilities and plans.
- (7) Power stations.

3. Terrain. Terrain in built-up areas is three-dimensional: ground level (streets and parks), above ground (buildings), and below ground (subways and sewers). Analysis of all man-made and natural terrain features is critical when planning to defend on built-up terrain. The commander's defensive plan is affected by the type of built-up area he will be operating in.

a. **Villages.**

- (1) Villages are often on chokepoints in valleys, dominating the only high-speed avenue of approach through the terrain. If the buildings in such a village are well constructed and provide good protection against both direct and indirect fires, a formidable defense can be mounted by placing a company in the town, while controlling close and dominating terrain with other battalion elements.
- (2) If the terrain allows easy bypass and there are no other villages on defendable terrain within a mutually supporting distance, units may be unwise to defend it. This would allow friendly forces to be easily bypassed and cut off ([Figure 4-2](#)).



Figure 4-2. Villages.

(3) Villages on the approaches to large towns or cities may be used by commanders to add depth to the defense or to secure the flanks. These villages are often characterized by clusters of stone, brick, or concrete houses and buildings. Company-size battle positions can be established in these small villages to block approaches into the main defensive positions.

b. Strip Areas.

(1) Strip areas consist of houses, stores, and factories and are built along roads or down valleys between towns and villages. They afford the defender the same advantages as villages.

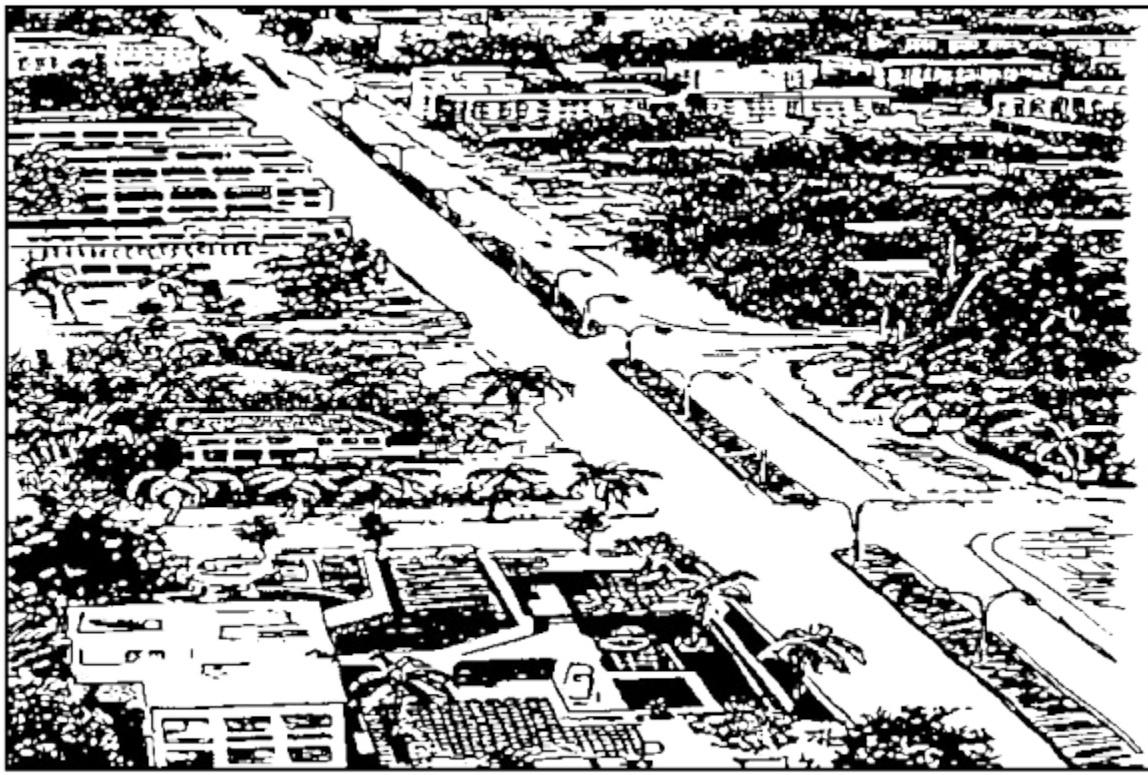


Figure 4-3. Strip areas.

(2) If visibility is good and enough effective fields of fire are available, a unit acting as a security force need occupy only a few strong positions spread out within the strip. This will deceive the enemy, when engaged at long ranges, into thinking the strip is an extensive defensive line. Strip areas often afford covered avenues of withdrawal to the flanks once the attacking force is deployed and before the security force becomes decisively engaged ([Figure 4-3](#)).

c. Towns and Cities.

(1) A small force can gain combat power advantage when defending a small city or town that is a chokepoint if it places tanks, BFVs, TOWs, and Dragons on positions dominating critical approaches. To deny the enemy the ability to bypass the town or city, the defending force must control key terrain and coordinate with adjacent forces. Reserve forces should be placed where they can quickly reinforce critical areas. Obstacles and minefields assist in slowing and canalizing the attacker.

(2) Finding positions in towns and cities that provide both good fields of fire and cover is often difficult. The forward edges of a town usually offer the best fields of fire but can be easily targeted by enemy overwatch and supporting fire. These areas often contain residential buildings constructed of light material. Factories, civil buildings, and other heavy structures, which provide adequate cover and are more suitable for a defense, are likely to be found deeper in the town and have limited fields of fire on likely avenues of approach.

(3) Since the forward edge of a town is the obvious position for the defender, it should be avoided. However, the defender can set up his position there if the terrain limits the enemy's ability for engagement or it contains strongly constructed buildings that give defending units adequate protection.

(4) A force may initially be assigned battle positions on the forward edge of the town. Its mission is to provide early warning of the enemy's advance, to engage the enemy at long range, and to deceive the enemy as to the true location of the defense. This force should withdraw in time to avoid decisive engagement. If there is limited observation from the forward edge, a force should be positioned on more favorable terrain forward or to the flanks of the town to gain better observation and to engage the enemy at long range.

(5) To prevent airmobile or airborne landings within the city or town, the commander must cover probable LZs and DZs, such as parks, stadiums, or large rooftops and heliports with obstacles or fire ([Figure 4-4](#)).

d. Large Built-Up Areas.

(1) In large built-up areas the commander must consider that the terrain is restrictive due to large buildings that are normally close together. This requires a higher density of troops and smaller defensive sectors than in natural open terrain. Units occupy defensive frontages about one-third the size of those in open areas. An infantry company, which might occupy 1,500 to 2,000 meters in open terrain, is usually restricted to a frontage of 300 to 800 meters in built-up areas. The density of buildings and rubble and street patterns will dictate the frontage of the unit ([Table 4-1](#)).



Figure 4-4. Towns and cities.

UNIT	FRONTAGES	DEPTHES
Battalion or Battalion TF	4 to 8 blocks	3 to 6 blocks
Company or Company Team	2 to 4 blocks	2 to 3 blocks
Platoon	1 to 2 blocks	1 block

NOTE: An average city block has a frontage of about 175 meters. These minimum figures apply in areas of dense, block-type construction; multistory buildings; and underground passages.

Table 4-1. Approximate frontages and depths in large built-up areas.

(2) In a large built-up area, a battalion is given a sector to defend and normally establishes a series of defensive positions. Unlike villages or towns, natural terrain close to the built-up area is not usually available for the commander to integrate into his plan. Although mutual support between positions should be maintained, built-up terrain often allows infiltration routes that the enemy may use to pass between positions. Therefore, the defender must identify the following:

- (a) Positions that enable him to place surprise fires on the infiltrating enemy.
- (b) Covered and concealed routes for friendly elements to move between positions (subways and sewers).
- (c) Structures that dominate large areas.
- (d) Areas such as parks, boulevards, rivers, highways, and railroads where anti-armor weapons have fields of fire.
- (e) Firing positions for mortars.
- (f) Command locations that offer cover, concealment, and ease of command and control.
- (g) Protect storage areas for supplies.

(3) Buildings that add most to the general plan of defense are chosen for occupation. Mutual support between these positions is vital to prevent the attacker from maneuvering and outflanking the defensive position, making it untenable. Buildings chosen for occupation as defensive positions should:

- (a) Offer good protection.
- (b) Have strong floors to keep the structure from collapsing under the weight of debris.
- (c) Have thick walls.

- (d) Be constructed of nonflammable materials (avoid wood).
- (e) Be strategically located (corner buildings and prominent structures).
- (f) Be adjacent to streets, alleys, vacant lots, and park sites. (These buildings usually provide better fields of fire and are more easily tied in with other buildings.)

4. Troops Available. Employment of troops in built-up areas depends on many factors governed by METT-T and on the mission.

a. **Employment of Squads.** Squads are usually employed abreast so that they all can fire toward the expected direction of attack. In a built-up area, squads may be separated by rooms within buildings or be deployed in different buildings. Squad positions must be mutually supporting and allow for overlapping sectors of fire, even if buildings or walls separate the positions ([Figure 4-5](#)).

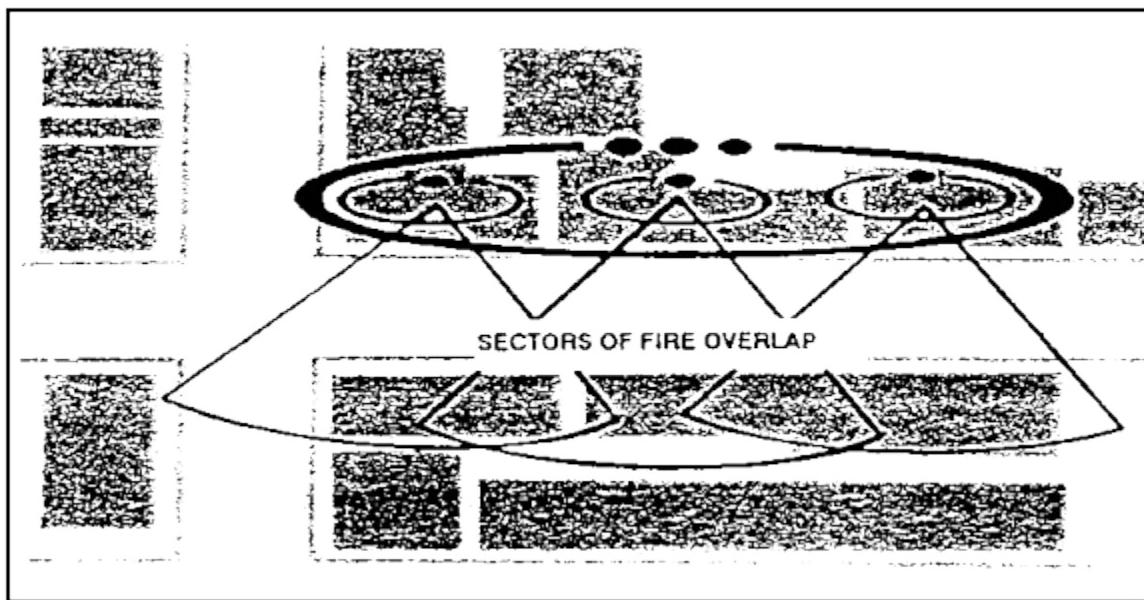


Figure 4-5. Sectors of fire.

b. **Employment of Platoons.** Once the commander has decided where to defend, he should select platoon battle positions or sectors that block or restrict the enemy's ability to maneuver and control key areas. The frontage for a platoon is about one to two city blocks long. Along with his primary and alternate positions, the platoon leader normally selects one supplementary position to reorient his defense to meet enemy threats from another direction.

c. **Employment of Companies.** Battalion commanders employ their companies in battle positions or sectors. The frontage of a company or company team defending in a built-up area is normally two to four city blocks long (300 to 800 meters). Depending on the type of built-up area, a company may be employed on the forward edge of the flanks of the area. This forces the enemy to deploy early without decisive engagement since it deceives the enemy as to the true location of the main defense. Other companies may then be employed in a series of strongpoints

in the center of the city or town. In all cases, mutual support between positions is vital. Companies should also have designated alternate and supplementary positions.

d. Employment of the Reserve. The commander's defensive plan must always consider the employment of a reserve. The reserve force should be prepared to counterattack to regain key positions, to block enemy penetrations, to protect the flanks, or to assist by fire in the disengagement and withdrawal of endangered positions. For combat in a built-up area, a reserve force:

- (1) Normally consists of infantry.
- (2) Must be as mobile as possible.
- (3) May be a platoon or squad at company level or one platoon at battalion level.
- (4) May be supported by tanks.

e. Employment of Tanks and Bradley Fighting Vehicles (BFVs). The commander should employ tanks and BFVs to take advantage of their long-range fires and mobility. Built-up areas restrict the mobility of tanks and BFVs and make them vulnerable to the anti-armor weapons of the enemy infantry.

- (1) When tanks and BFVs are employed in the defense of a city, infantry should be positioned to provide security against close anti-armor fires and to detect targets for the armored vehicles. Tanks and BFVs should be assigned primary, alternate, and supplementary positions, as well as primary and alternate sectors. BFVs and antitank weapons should supplement tank fires.
- (2) Tanks and BFVs should be located on likely avenues of approach to take advantage of their long-range fires. They may be:
 - (a) Positioned on the edge of the city in mutually supporting positions.
 - (b) Positioned on key terrain on the flanks of town and villages.
 - (c) Used to cover barricades and obstacles by fire.
 - (d) Part of the reserve.
- (3) Tanks and BFVs are normally employed as a platoon. However, sections and individual tanks and BFVs may be employed with infantry platoons and squads. This provides tanks and BFVs with the close security of the infantry. Tanks and BFVs provide the commander with a mobile force to respond quickly to enemy threats on different avenues of approach.

f. Employment of Fire Support. Fire planning must be comprehensive due to the proximity of buildings to targets, minimum range restrictions, and repositioning requirements. Mortar and artillery fires are planned on top of and immediately around defensive positions for close support.

(1) Artillery fire support may be used in the direct or indirect fire role. Artillery fire should be used:

- (a) To suppress and blind enemy overwatch elements.
- (b) To disrupt or destroy an assault.
- (c) To provide counterbattery fire.
- (d) To support counterattacks.
- (e) To provide direct fire when necessary.

(2) Mortars at battalion and company level are employed to maximize the effect of their high-angle fires. They should be used to engage:

- (a) Enemy overwatch positions.
- (b) Enemy infantry before they seize a foothold.
- (c) Targets on rooftops.
- (d) Enemy reinforcements within range.

(3) Final protective fires (FPFs) are planned to stop dismounted assaults in front of the defensive positions. Fires within the city are planned along likely routes of advance to destroy the enemy as he attempts to deepen a penetration.

(4) At battalion level, the commander should establish priorities of fire based on enemy avenues of approach and threat systems that present the greatest danger to the defense. For example, during the attacker's initial advance, tanks, BMPs, and overwatching elements are the greatest threat to the defense. ATGMs should concentrate on destroying tanks first, then BMPs. Artillery and mortar fires should suppress and destroy enemy ATGMs and overwatch positions and elements. If enemy formations secure a foothold, priority is shifted to the destruction of enemy forces within the penetration.

(5) As the enemy attack progresses in the city, fires are increased to separate infantry from supporting tanks and fighting vehicles. During this phase, friendly artillery concentrates on attacking infantry, counterfire missions, and the destruction of reinforcements that are approaching the city.

(6) When initiated, counterattacks are given priority of supporting fires. When artillery is firing the missions as mentioned above, it must remain mobile and be prepared to displace to preplanned positions to avoid enemy counterbattery fire.

(7) The battalion mortar platoon may be initially positioned forward in support of the reconnaissance platoon. After withdrawal of the reconnaissance platoon, the mortar platoon is positioned where it can support the whole battalion.

(8) At company and platoon level, fire plans include fires of organic, attached, and supporting weapons. The company commander also plans his own mortar and artillery fires on top of and immediately around his battle positions for close support.

(9) Based on the location of platoon positions in relation to the most likely avenues of advance, the company commander should assign FPFs to platoon leaders. Each rifle platoon leader then assigns his machine guns sectors of fire and final protective lines (FPLs). These positions should be selected to provide interlocking grazing fire and mutual support between adjacent units. FPLs are fired on planned signals from the platoon forward observers. Proposed FPLs must be "walked out" to determine the extent of grazing fire available and to locate dead space, which can be covered by:

- (a) Sniper fire.
- (b) Grenade launchers.
- (c) Mines and booby traps.
- (d) Indirect fires.

(10) Air defense assets available to the commander, such as Stinger and Vulcan, are normally employed to ensure all-round air defense. The lack of good firing positions for long-range air defense missile systems in the built-up area may limit the number of deployed weapons. In the defense, weapons systems may have to be winched or airlifted into positions. Rooftops and parking garages are good firing positions because they normally offer a better line-of-sight. Stingers and Vulcans can be assigned the missions of protecting specific positions or in general support of the battalion.

g. Employment of Engineers. Engineers are employed under battalion control or attached to companies and platoons. Normally, one engineer platoon or company supports a battalion or battalion task force. Commanders must consider engineer tasks that enhance survivability, mobility, and countermobility. Tasks that engineers can accomplish in the defense of a built-up area include:

- (1) Constructing obstacles and rubble.
- (2) Clearing fields of fire.
- (3) Laying mines.
- (4) Preparing routes to the rear.
- (5) Preparing fighting positions.

h. Employment of the Anti-armor Company. The anti-armor company normally supports the battalion security force, providing long-range anti-armor fires forward of the main defense. Separate anti-armor sections may be attached to companies to cover likely armor approaches. Once the security force withdraws, the anti-armor company is normally employed in GS of the battalion. If the threat is not armored, or if the terrain prevents the use of the TOW weapons

system, anti-armor platoons and companies in light airborne and air assault units can mount MK 19 grenade launchers and .50 caliber machine guns to support the defending units.

i. **Employment of the Reconnaissance Platoon.** Depending on the situation and terrain, the battalion reconnaissance platoon may provide a security force forward of the built-up area to give the commander early warning of enemy activity. Upon withdrawal of the security force, the reconnaissance platoon may be given the mission to ensure flank or rear security, to occupy a defensive sector (or battle position), or to stay in reserve.

j. **Employment of Ground Surveillance Radar (GSR).** If attached, GSR is best employed on the outskirts of built-up areas because of the line-of-sight problems within the area. During limited visibility, if suitable avenues exist, GSR can be placed to monitor sectors. Because of the normal ranges found in built-up areas and the likely narrowness of the sector ranges, GSR can be vulnerable to detection and direct fire. Cross vectoring is important in this environment.

5. Time Available. The commander must organize and establish priorities of work, depending upon the time available. Many tasks can be accomplished at the same time, but priorities for preparation should be according to the commander's order. In defensive operations, an example priority of work sequence follows.

a. **Establish Security.** The unit should quickly establish all-round security by placing forces on likely approaches. Troop positions should have at least one soldier to provide security during all preparations. The reconnaissance and counter-reconnaissance plan should be emphasized.

b. **Assign Sectors of Responsibility.** Boundaries define sectors of responsibility. They include areas where units may fire and maneuver without interference or coordination with other units. Responsibility for primary avenues of approach should never be split. In areas of semidetached construction, where observation and movement are less restricted, boundaries should be established along alleys or streets to include both sides of a street in a single sector. Where buildings present a solid front along streets, boundaries may have to extend to one side of the street ([Figure 4-6](#)).

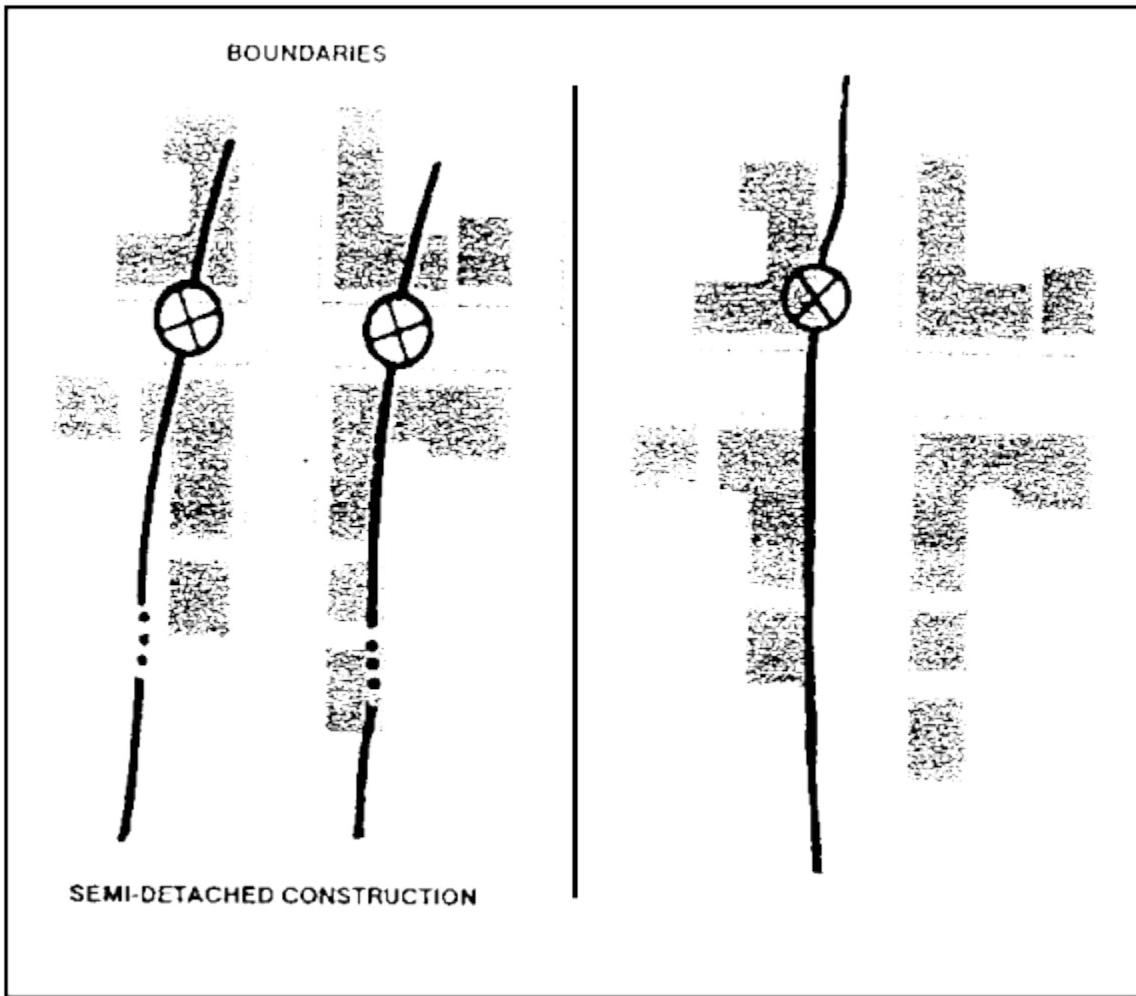


Figure 4-6. Boundaries in built-up areas.

c. **Clear Fields of Fire.** In built-up areas, commanders may need to rubble certain buildings and structures to provide greater protection and fields of fire to the defender. If the ceiling of a lower-story room can support the weight of the rubble, collapsing the top floor of a building before the battle starts may afford better protection against indirect fires. Rubbling an entire building can increase the fields of fire and create an obstacle to enemy movement. Defenders must be careful, however. Rubbling buildings too soon (or too many) may give exact locations and destroy the cover from direct fire. Rubbled buildings may also interfere with planned routes of withdrawal or counter-attack.

d. **Select and Prepare Initial Fighting Positions.** The commander should select positions in depth. The unit should prepare positions as soon as troops arrive and continue preparing as long as positions are occupied. Enemy infiltration or movement sometimes occurs between and behind friendly positions. Therefore, each position must be organized for all-round defense. The defender should also:

- (1) Make minimum changes to the outside appearance of buildings where positions are located.

- (2) Screen or block windows and other openings to keep the enemy from seeing in and tossing in hand grenades. This must be done so that the enemy cannot tell which openings the defenders are behind.
- (3) Remove combustible material to limit the danger of fire. Fires are dangerous to defenders and create smoke that could conceal attacking troops. For these reasons, defenders should remove all flammable materials and stockpile firefighting equipment (water, sand, and so forth). The danger of fire also influences the type of ammunition used in the defense. Tracers or incendiary rounds should not be used extensively if threat of fire exists.
- (4) Turn off electricity and gas. Both propane and natural gas are explosive. Natural gas is also poisonous and is not filtered by a protective mask. Propane gas, although not poisonous, is heavier than air. If it leaks into an enclosed area, it displaces the oxygen and causes suffocation. Gas mains and electricity should be shut off at the facility that serves the city.
- (5) Locate positions so as not to establish a pattern. The unit should avoid obvious firing locations like church steeples.
- (6) Camouflage positions.
- (7) Reinforce positions with materials available such as beds, furniture, and so forth.
- (8) Block stairwells and doors with wire or other material to prevent enemy movement. Create holes between floors and rooms to allow covered movement within a building.
- (9) Prepare range cards, fire plans, and sector sketches.
- (10) Emplace machine guns in basements. When basements are not used, they should be sealed to prevent enemy entry.
- (11) Establish an extra supply of Class V and medical supplies.

e. Establish Communications. Commanders should consider the effects of built-up areas on communications when they allocate time to establish communications. Line-of-sight limitations affect both visual and radio communications. Wire laid at street level is easily damaged by rubble and vehicle traffic. Also, the noise of built-up area combat is much louder than in other areas, making sound signals difficult to hear. Therefore, the time needed to establish an effective communications system may be greater than in more conventional terrain. Commanders should consider the following techniques when planning for communications:

- (1) If possible, lay wire through buildings for maximum protection.
- (2) Use existing telephone systems. Telephones are not always secure even though many telephone cables are underground.
- (3) Emplace radios and retransmission sites on the second or third floor of a building.

(4) Use messengers at all levels since they are the most secure means of communications.

f. Emplace Obstacles and Mines. To save time and resources in preparing the defense, commanders must emphasize using all available materials (automobiles, railcars, rubble) to create obstacles. Civilian construction equipment and materials must be located and inventoried. This equipment can be used with engineer assets or in place of damaged equipment. Coordination must be made with proper civilian officials before use. Engineers must be able to provide advice and resources as to the employment of obstacles and mines. The principles for employing mines and obstacles do not change in the defense of a built-up area; however, techniques do change. For example, burying and concealing mines in streets are hard due to concrete and asphalt. Obstacles must be tied in to buildings and rubble areas to increase effectiveness and to canalize the enemy. Family of scatterable mines (FASCAM) may be effective on the outskirts of a city or in parks; however, in a city core, areas may be too restrictive.

g. Improving Fighting Positions. When time permits, all positions, to include supplementary and alternate positions, should be reinforced with sandbags and provide overhead cover. Timely and accurate support from attached engineers help in this effort.

h. Establish and Mark Routes Between Positions. Reconnaissance by all defending elements should help select routes for use by defenders moving between positions. Movement is crucial in fighting in built-up areas. Early selection and marking of routes adds to the defender's advantages.

COMMAND AND CONTROL

In all defensive situations, the commander should position himself well forward so that he can control the action. In a built-up environment, this is even more critical due to obstacles, poor visibility, difficulty in communication, and intense fighting. Graphic control measures common to other tactical environments are also used in combat in built-up areas. Streets are ideal for phase lines. These and other control measures ensure coordination throughout the chain of command.

1. Command Post Facilities. Command post facilities should be located underground. Their vulnerability requires all-round security. Since each facility may have to secure itself, it should be near the reserve unit for added security. When collocated with another unit, command post facilities may not need to provide their own security. Also, a simplified organization for command posts is required for ease of movement. Since rubble often hinders movement of tracked and wheeled vehicles, battalion and company headquarters must be prepared to backpack communications and other needed equipment for operations.

2. Organization of the Defense. The battlefield is divided into three operational areas; deep, close, and rear. At the battalion level, operations are conducted in the close operational area. The defense is organized into three areas; the security force area, main battle area, and rear area. A battalion defending in built-up areas may have missions in any one of these areas, depending on the mission of the brigade or division ([Figure 4-7](#)).

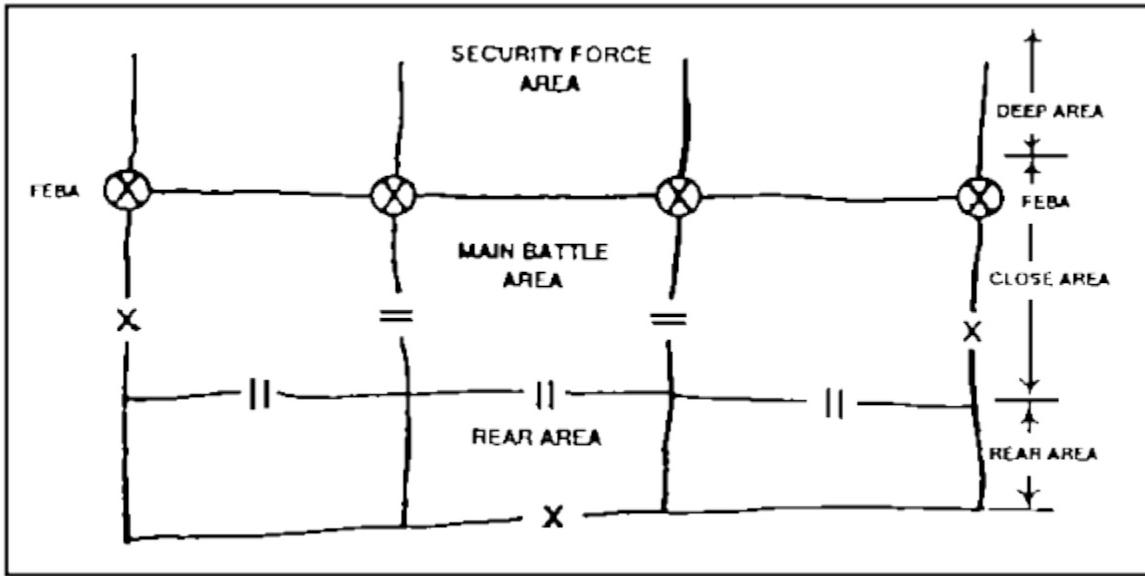


Figure 4-7. Organization of the battlefield.

a. **Security Operations.** The defensive battle begins with a combined arms force conducting security operations well forward of the main body. Security operations include screening operations, guard operations, and when, augmented with additional CS and CSS assets, covering force operations. The commander decides which operation is appropriate based on the factors of METT-T. The designated force uses all available combat power to destroy the enemy and slow his momentum. Artillery, tactical air, and attack helicopters are employed to fight the initial battle.

(1) Security operations add to the defense by:

- (a) Alerting the defense to the strength, location, and general direction of the enemy main and supporting attacks.
- (b) Delaying enemy first-echelon detachments.
- (c) Initiating early engagement of enemy forces.
- (d) Deceiving the enemy as to the true location of the main defense force.

(2) The withdrawal of the security forces must not result in an easing of pressure on the enemy. The built-up area environment may complicate battle handover from the security force to the main battle area (MBA) force. However, this transition must be accomplished smoothly to prevent the enemy from gaining momentum.

b. **Main Battle Area.** The decisive battle is fought in the MBA. Depending on the Threat, the battalion commander may deploy companies on the forward edges of the city or in battle positions in depth. In either case, the defense is made stronger by including forces that are defending on close terrain on the flanks into the defensive scheme. The battalion commander normally employs a security force to the front to provide early warning and to deny the enemy intelligence on the battalion's defensive dispositions ([counter-reconnaissance](#)) ([Figure 4-8](#)).

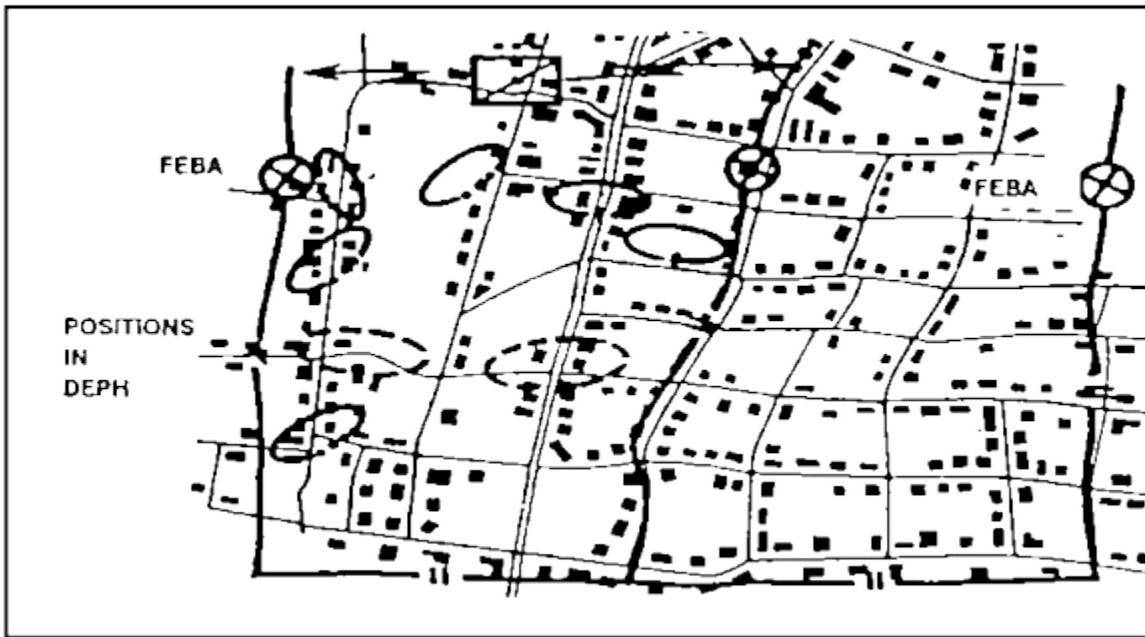


Figure 4-8. Main battle area.

- (1) The size and location of battle positions within the battalion's area of operations depends mainly on the type of enemy encountered and the ability to move between positions to block threatened areas. It may be desirable to place small anti-armor elements, secured by infantry, on the forward edges while the main defense is deployed in depth.
- (2) A force assigned battle positions on the forward edge of a city or town should:
 - (a) Provide early warning of the enemy's advance.
 - (b) Engage the enemy at long range.
 - (c) Deceive the enemy as to the true location of the defense.
- (3) When enemy forces enter and maneuver to seize initial objectives, the defender should employ all available fires to destroy and suppress the direct-fire weapons that support the ground attack. Tanks and BMPs should be engaged as soon as they come within the effective range of anti-armor weapons.
- (4) As the enemy attack develops, the actions of small-unit leaders assume increased importance. Squad and platoon leaders are often responsible for fighting independent battles. Thus, it is important that all leaders understand their commander's concept of the defense.

c. **Rear Area.** The rear area is behind the MBA. It is the area from which supply and maintenance support is sent forward. At battalion level, the rear area facilities are in the MBA. They are not organized as combat elements but are critical to the overall defense. Protection of these elements is vital.

3. Counterattack. Small infantry-heavy reserves supported by BFVs and or tanks (if present) should be prepared to counter-attack to regain key positions, to block enemy penetrations, to provide flank protection, and to assist by fire the disengagement and withdrawal of endangered positions. When the reserves are committed to counterattack to reinforce a unit, they may be attached to the unit in whose sector the counterattack is taking place. Otherwise, the counterattack becomes the main effort. This makes coordination easier, especially if the counterattack goes through the unit's positions.

4. Defense During Limited Visibility. The TF and team commander can expect the attacker to use limited visibility conditions to conduct necessary operations to sustain or gain daylight momentum.

a. Commanders should employ the following measures to defend against night attacks:

- (1) Defensive positions and crew-served weapons should be shifted just before dark to deceive the enemy as to their exact location. (A squad or fire team can often be shifted to an adjacent building and cover the same avenue of approach.)
- (2) Unoccupied areas between units, which can be covered by observed fire during daylight, may have to be occupied or patrolled at night.
- (3) Radar, remote sensors, and night observation devices should be emplaced on streets and open areas.
- (4) Nuisance mines, noise-making devices, tanglefoot tactical wire, and OPs should be positioned on secondary avenues of approach for early warning.
- (5) Observation posts, planned indirect fires, patrols, and anti-intrusion devices should be used to prevent infiltration.
- (6) Artificial illumination should be planned, to include the use of street lamps, stadium lights, and so forth.
- (7) Indirect fire weapons, grenade launchers, and hand grenades should be used when defenses are probed to avoid disclosure of defensive positions.

b. When the enemy begins his night assault, FPFs should be initiated by a planned signal. Crew-served weapons, tank-mounted weapons, and individual riflemen fire within their assigned sectors. Grenades and command detonated mines should be used to supplement other fires as the enemy approaches the positions.

c. Defenders should move to daylight positions before the beginning morning nautical twilight (BMNT). During attacks in fog, rain, or snowstorms, many of the techniques described for night defense apply. Commanders must rely on OPs and patrolling in these situations.

DEFENSIVE PLAN AT BATTALION LEVEL

The built-up area defensive plan at battalion level depends on the size and location of the area. Many factors must be considered before instituting such a plan.

1. Defense of a Village. A battalion TF assigned a defensive sector that includes a village may incorporate the village as a strongpoint in its defense. This use of a built-up area is most common

where the village stands astride a highspeed avenue of approach or where it lies between two difficult obstacles. To incorporate such an area into its defense, the battalion TF must control the high ground on either side of the village to prevent the enemy from firing from those areas into the village.

- a. The majority of the TF tanks and BFVs should be employed where the maneuver room is the greatest (on the key terrain to the flanks of the village). This is also where the TF anti-armor vehicles (BFVs and or ITVs) should be employed. As the security force withdraws and companies and teams assume the fight, BFVs and ITVs can assume support by fire positions in depth.
- b. Although the battalion TFs disposition should prevent large enemy forces from threatening the rear and flanks of the village, the danger of small-unit enemy infiltration means that the village must be prepared for all-round defense.
- c. Engineers required for team mobility operations should stay with the company or company team in the town to provide continuous engineer support if that company or company team becomes isolated. Engineer support for the rest of the TF should be centrally controlled by the TF commander. Engineer assets may be in DS of the other companies or company teams. The priority of barrier materials, demolitions, and mines should go to the company or company team in the village.
- d. The TF commander should use the key terrain on the village's flanks for maneuver to prevent the village's defense from becoming isolated. The strongpoints in the town should provide a firm location where the enemy can be stopped, around which counterattacks can be launched ([Figure 4-9](#)).

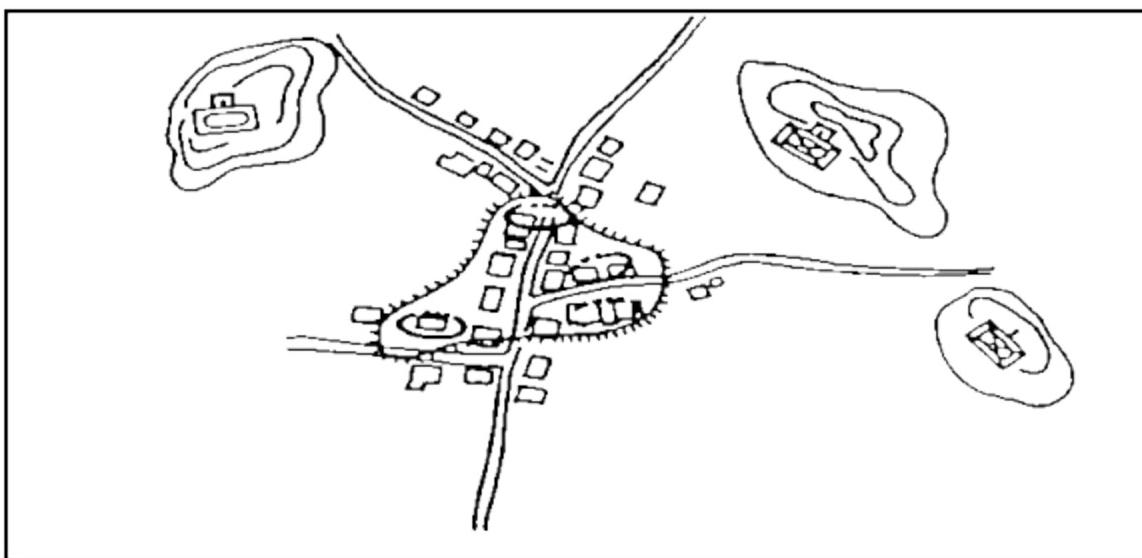


Figure 4-9. Battalion defense of a village.

2. Defense In Sector. Along with defending a village, a battalion TF may be given the mission of defending a sector in a city ([Figure 4-10](#)). The battalion should take advantage of the outlying structures to provide early warning and to delay the enemy, and of the tougher interior buildings to provide fixed defense. This defense should cover an area about 4 to 12 blocks square.

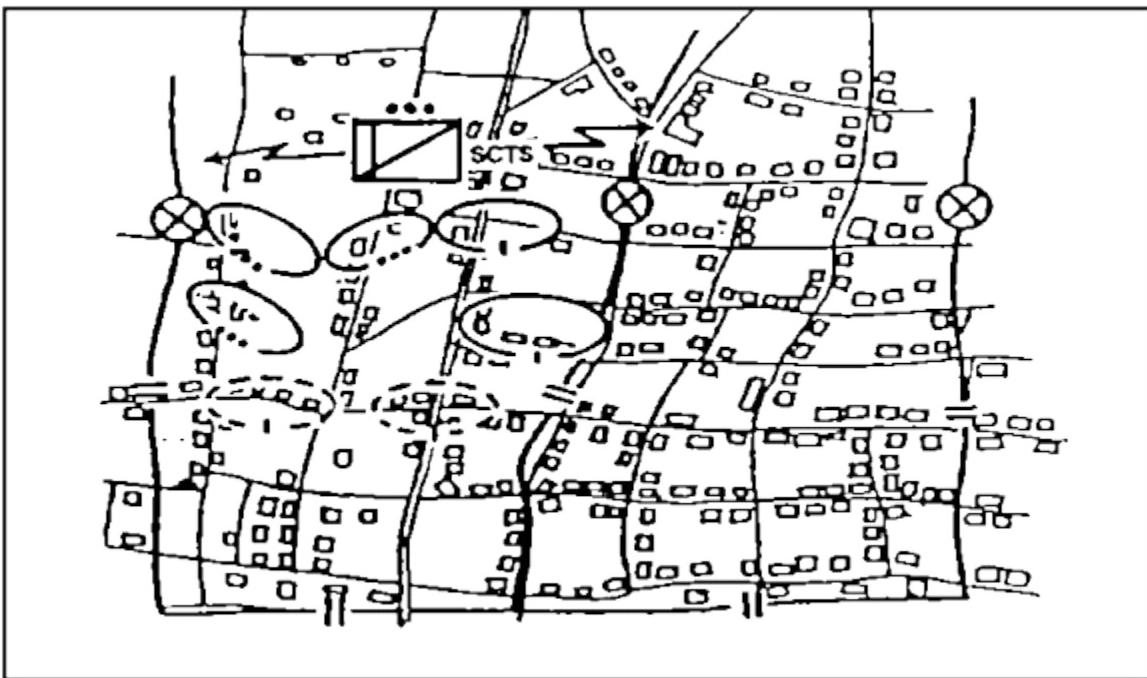


Figure 4-10. Defense of a built-up sector.

- a. The battalion TF deployment begins with the reconnaissance platoon reconnoitering the built-up area to provide an area reconnaissance and location of the enemy. At the edge of the area, where fields of fire are the greatest, the battalion TF should deploy BFVs and ITVs and other anti-armor weapons systems to provide long-range anti-armor defense.
- b. The FEBA should include the most formidable buildings in the sector. Forward of the FEBA, the battalion TF should organize a guard force, which could be a reinforced company. The guard force should concentrate on causing the enemy to deploy without engaging the enemy in decisive combat. This can be done through maximum use of ambushes and obstacles, and of covered and concealed routes through buildings for disengagement. The guard force inflicts casualties and delays the enemy but avoids decisive engagement since buildings beyond the FEBA do not favor the defense. As the action nears the FEBA, the guard force detects the location of the enemy's main attack. Upon reaching the FEBA, the guard force can be used as a reserve and reinforce other elements of the battalion, or it can counterattack to destroy an enemy strongpoint.
- c. The defense along the FEBA consists of a series of positions set up similar to that described in the [company defense of the village](#). Key terrain features, such as strong buildings, road junctions, and good firing positions, should be the center of the strongpoint defense. Based on METT-T considerations, the defense in sector may consist of either strongpoints or battle positions. Strongpoints located on or covering decisive terrain are extremely effective in the defense. Buildings should be prepared for defense as outlined in Appendix D (Subterranean Operations), [FM 90-10-1](#).

- d. BFVs should be used to engage BMPs, BTRs, and BRDMs; to cover obstacles with fire; and to engage in counterattacks with tanks. They can also be used to transport casualties and supplies to and from the fight.
 - e. The battalion's attached tanks should be used to engage enemy tanks, cover obstacles by fire, and engage in counter-attacks. They should be employed in platoons where possible, but in congested areas they may be employed in sections.
 - f. Artillery and mortar fire should be used to suppress and blind enemy overwatch elements, to engage enemy infantry on the approaches to the door, to provide counterbattery fire, and to support counterattacks using both indirect and direct fire.
 - g. Engineers should be attached to the delaying force to help in laying mines and constructing obstacles, clearing fields of fire, and preparing routes to the rear. These routes should also have obstacles. Engineers should be in support of the force in the strongpoints to help prepare fighting positions.
3. Delay in a Built-Up Area. The purpose of a delay is to slow the enemy, cause enemy casualties, and stop the enemy (where possible) without becoming decisively engaged or being outmaneuvered. The delay can either be oriented on the enemy or on specified terrain such as a key building or manufacturing complex.
- a. A delay in a built-up area consists of a succession of ambushes and battle positions (see [Figure 4-11](#)).
 - (1) Ambushes are planned on overwatching obstacles and are closely coordinated but decentrally executed. The deployment of the battalion TF is realigned at important cross streets. The ambushes can be combined with limited objective attacks on the enemy's flanks. These are usually effective in the edge of open spaces, wide streets, and so on. These should be executed by tanks and BFVs along with dismounted infantry.

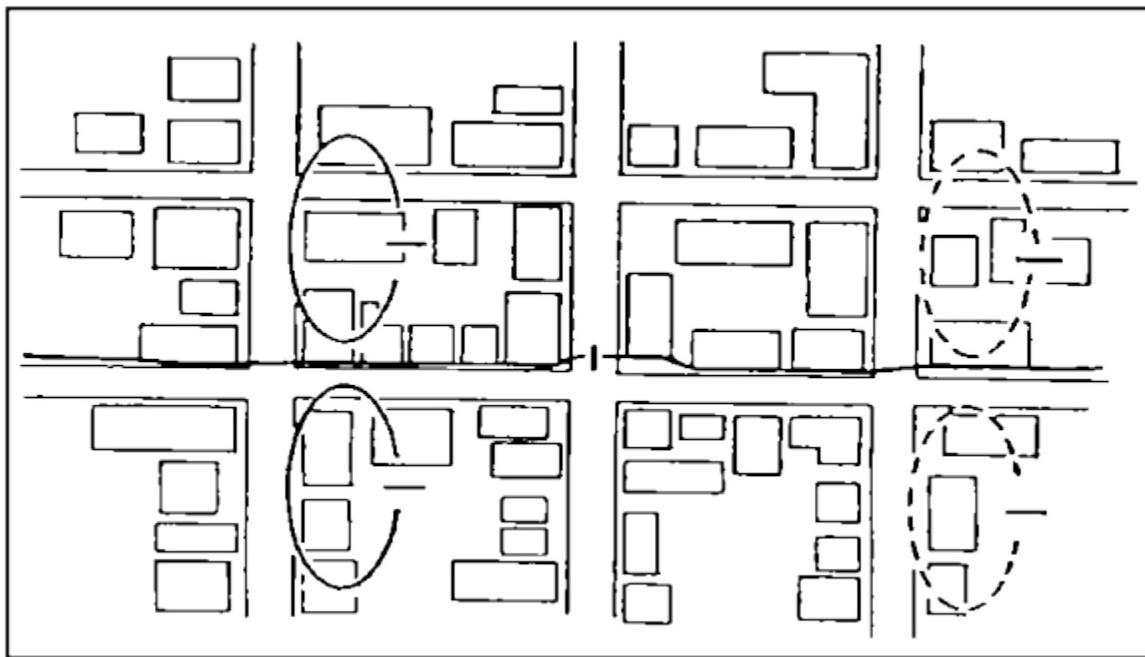


Figure 4-11. Battalion delay in a built-up area.

- (2) Battle positions should be placed where heavy weapons, such as tanks, BFVs, TOWs, anti-armor weapons, and machine guns, will have the best fields of fire. Such locations are normally found at major street intersections, parks, and at the edge of open residential areas. Battle positions should be carefully and deliberately prepared, reinforced by obstacles and demolished buildings, and supported by artillery and mortars. They should inflict maximum losses on the enemy and cause him to deploy for a deliberate attack.
- b. Tanks, BFVs, and anti-armor weapons should have prepared primary and alternate positions to reduce their vulnerability. Coordination must be ongoing with withdrawing ambushes until they are safely within the battle position.
- c. The battalion TF is most effective when deployed in two delaying echelons, alternating between conducting ambushes and fighting from battle positions. As the enemy threatens to overrun a battle position, the company disengages and delays back toward the next position. As the company passes through the company to the rear, it establishes another battle position. Smoke and demolitions are used to aid in the disengagement. Security elements on the flank can be employed to prevent the enemy from out-flanking the delay. A small reserve can be used to react to unexpected enemy action and to conduct continued attacks on the enemy's flank.
- d. The direction of the engineer effort should be centralized to support the preparation of battle positions. It should be decentralized to support the force committed to ambush.
- e. The width of the TF zone depends upon the nature of the buildings and obstacles along the street and the time that the enemy must be delayed.

DEFENSIVE PLAN AT COMPANY LEVEL

The defensive plan in built-up areas at company level depends on the size and location of the area. Many factors must be considered before instituting such a plan.

1. Defense of a Village. Once the company commander has completed his reconnaissance of the village, he scouts the surrounding terrain and, with the information assembled, develops his plan for the defense ([Figure 4-12](#)). One of his first decisions is whether to defend with his infantry on the leading edge of the village or farther back within the village.

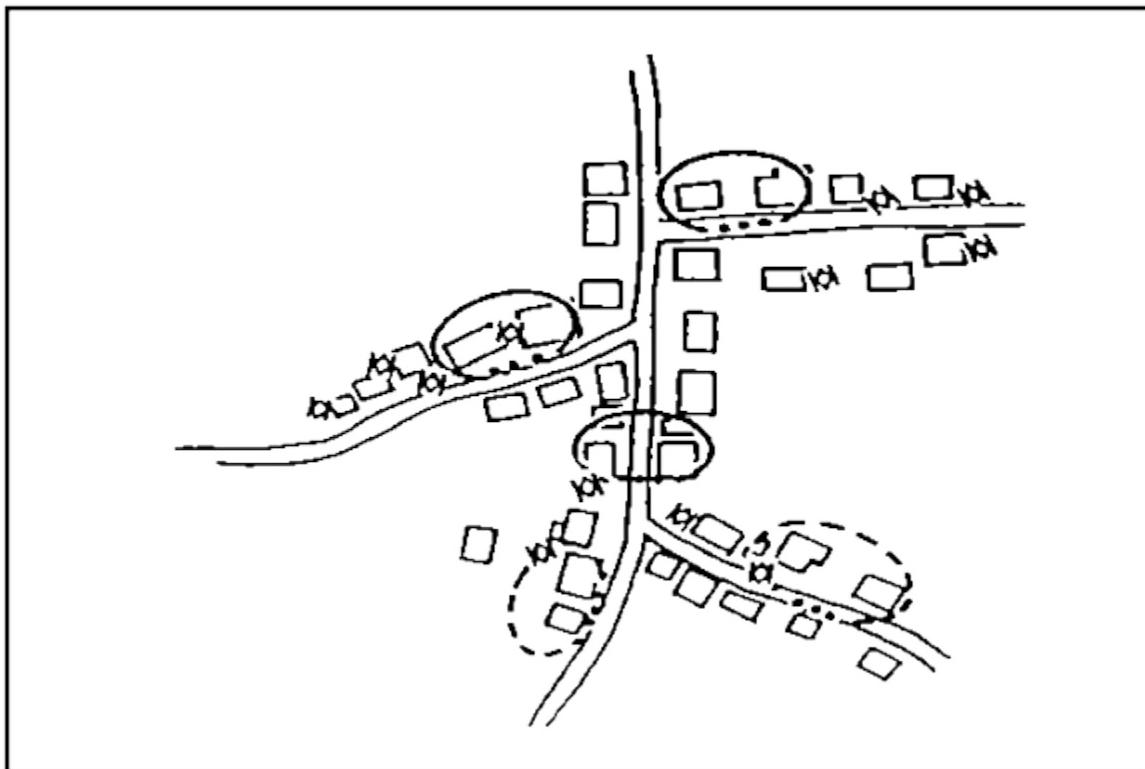


Figure 4-12. Company defense of a village.

- a. Several factors influence the commander's decision. First, he must know the type of enemy that his company will defend against. If the threat is mainly dismounted infantry, the greatest danger is allowing them to gain a foothold in the town. If the threat is armor or motorized infantry, the greatest danger is that massive direct fire will destroy the company's defensive positions. The company commander must also consider the terrain forward and to the flanks of the village from which the enemy can direct fires against his positions.
- b. Platoons are given a small group of buildings in which to prepare their defense, permitting the platoon leader to establish mutually supporting squad-size positions. This increases the area that the platoon can control and hampers the enemy's ability to isolate or bypass a platoon. A platoon is responsible for the road through the village. The rest of the company is positioned to provide all-round security and defense in depth.
- c. A position for the company mortars must be chosen that protects mortars from direct fire and allows for overhead clearance. The company's BFVs or APCs are placed in positions to the rear

of the buildings and interior courtyards where their weapon systems can provide added rear and flank security. Combat vehicles are assigned primary, alternate, and supplementary positions as well as primary and secondary sectors of fire. They should be positioned in defilade behind rubble and walls, or inside buildings for movement into and out of the area. Control of the platoon's BFVs or APCs by the platoon leader is required for resupply, MEDEVAC, and rapid repositioning during the battle.

d. The company commander locates a forward area where he can position his company trains. A location is chosen near the highway to ease recovery and maintenance operations. A company OP is established where the fields of observation are best.

e. The company commander must also decide which buildings must be rubbed. To defeat the enemy he must have good fields of fire, but rubbing the buildings too soon or rubbing too many may disclose his exact locations and destroy cover from direct fire. The company's TOWs are positioned on high ground in and around the town to attain good fields of fire to the front and flanks.

f. If a tank platoon is available from the TF, the company commander could place the tanks along the leading edge where rapid fire would complement the TOWs and Dragons. The tank platoon leader should select exact firing positions and assign sectors of fire. If faced by enemy infantry, the tanks move to alternate positions with the protection of the infantry. These alternate positions allow the tanks to engage to the front as well as the flanks with as little movement as possible. After they are withdrawn from the leading edge of the town, the tanks could provide a mobile reserve for the team.

g. FPFs are planned to address the biggest threat to the platoon; the enemy's infantry. When firing an FPF inside a built-up area is required, mortars are more effective than artillery. This is due to their higher angle of fall which gives them a greater chance of impacting on the street.

h. Obstacles, mainly antivehicle obstacles, are easily constructed in a built-up area. The company commander must stop enemy vehicles without interfering with his own movement in the village. Therefore, he executes the emplacement of cratering charges at key street locations on order. Mines are laid on the outskirts of the town and along routes the company will not use.

i. The supporting engineers use C4 and other explosives to make firing ports, mouseholes, and demolition obstacles. Based upon his priority of work, the commander tells the engineer squad leader to assist each of the infantry platoons preparing the village for defense and to execute the team's obstacle plan. The squad leader's mission is to tell the infantrymen exactly where to place the demolitions and how much is needed for the desired effect. He also assists in the emplacement and recording of the minefields as well as the preparation of fighting positions.

j. Ammunition expenditure is usually high when fighting in a built-up area. To avoid moving around the village with ammunition re-supply during the battle, the commander directs that more ammunition be stockpiled in each occupied platoon and squad position. He also orders the platoons to stockpile firefighting equipment, drinking water, food, and first-aid supplies at each squad position. Other factors the company commander must consider are:

- (1) Resupply.
- (2) Medical evacuation.
- (3) Communications.
- (4) Firefighting.
- (5) Sleep and alert plans.
- (6) Security.
- (7) Limited visibility.
- (8) Civilian control.

k. To ensure adequate communications, the company installs a wire net and develops a plan for pyrotechnic signals. Backup wire should be laid in case primary lines are cut by vehicles, fires, or the enemy. The commander also plans for the use of messengers throughout the village.

2. Defense of a City Block. A company in a built-up area may have to defend a city block in a core periphery or residential area. It conducts this operation according to the defensive scheme of the battalion. The operation should be coordinated with the action of security forces charged with delaying to the front of the company's position. The defense should take advantage of the protection of buildings that dominate the roads.

a. A well-organized company defense:

- (1) Stops the attack of the enemy on the roads by using obstacles and enfilade fire.
- (2) Destroys the enemy by ambush and direct fire from prepared positions.
- (3) Ejects the enemy from footholds or remains in place for a counterattack conducted by battalion.

b. The operation of the company is more effective if it has time to reconnoiter the terrain, and to prepare obstacles and fire lanes. Vehicles not needed for the defense should be grouped in the combat trains at battalion. The OPs should be supplemented by patrols, mainly at night, and communications should be wire. The company should be organized to provide a series of OPs, a defense, and a reserve that is tasked with counterattacks.

c. The defensive forces should ambush on the avenues of approach, cover the obstacles by fire, and prepare a strong defense inside the buildings. The reserve can be tasked:

- (1) To reinforce the fires of the defense.
- (2) To react to a danger on the flank.
- (3) To counterattack to throw the enemy from a foothold.

d. Engineers should be controlled at company level. They construct obstacles, prepare access routes, and assist in preparing defensive positions. A company or section of tanks attached to the

company should provide heavy direct-fire support, engage enemy tanks, and support counterattack.

3. Company Delay. A company delay can be part of a battalion's defense ([Figure 4-13](#)). Its operations destroy enemy reconnaissance elements forward of the outskirts of the town, prevent their penetration of the built-up areas, and gain and maintain contact with the enemy to determine the strength and location of the main attack.

a. The company's sector should be prepared with obstacles to increase the effect of the delay. Engineers prepare obstacles on main routes but avoid some covered and concealed routes that are known by the friendly troops for reinforcement, displacement, and re-supply. These routes are destroyed when no longer needed.

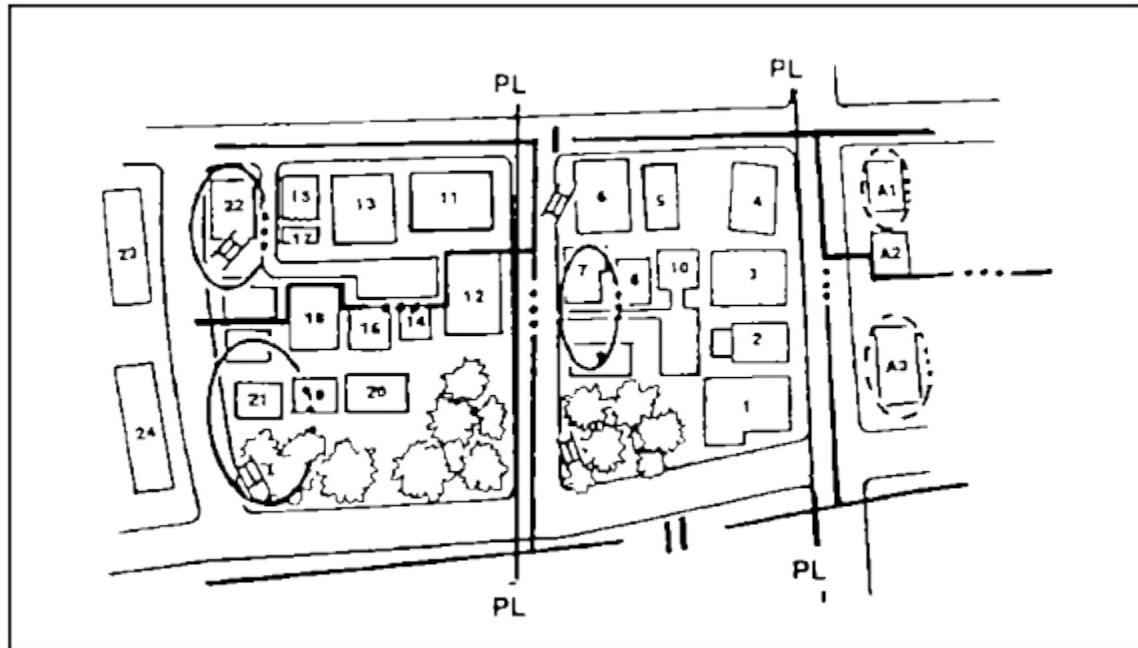


Figure 4-13. Company delay in a built-up area.

- b. Anti-armor weapon systems are positioned on the outskirts of the town to destroy the enemy at maximum range. They should be located in defilade positions or in prepared shelters. They fire at visible targets and then fall back or proceed to alternate positions. Platoons should be assigned sectors from 500 to 700 meters (one to two blocks) wide. They should be reinforced with sensors or GSRs, which can be emplaced on the outskirts or on higher ground. Platoons delay by using patrols, OPs, and ambushes and by taking advantage of all obstacles. Each action is followed by a disengagement and withdrawal. By day, the defense is dispersed; at night, it is more concentrated. Close coordination is vital.
- c. Tanks support the platoon by engaging enemy tanks, providing reinforcing fires, aiding the disengagement of the platoons, and covering obstacles by fire.
- d. BFVs support the platoon in the same manner as tanks except they engage BTRs, BMPs, and BRDMs.

4. Defense of a Traffic Circle. A rifle company or company team may be assigned the mission of defending a key traffic circle in a built-up area to prevent the enemy from seizing it ([Figure 4-14](#)).

- a. The company commander with this mission should analyze enemy avenues of approach and buildings that dominate those avenues. He should plan all possible fire power on the traffic circle itself and on the approaches to it. He should also plan for all-round defense of the buildings that dominate the traffic circle to prevent encirclement. The commander should prepare as many covered and concealed routes between these buildings as possible. This makes it easier to mass or shift fires, and to execute counterattacks.

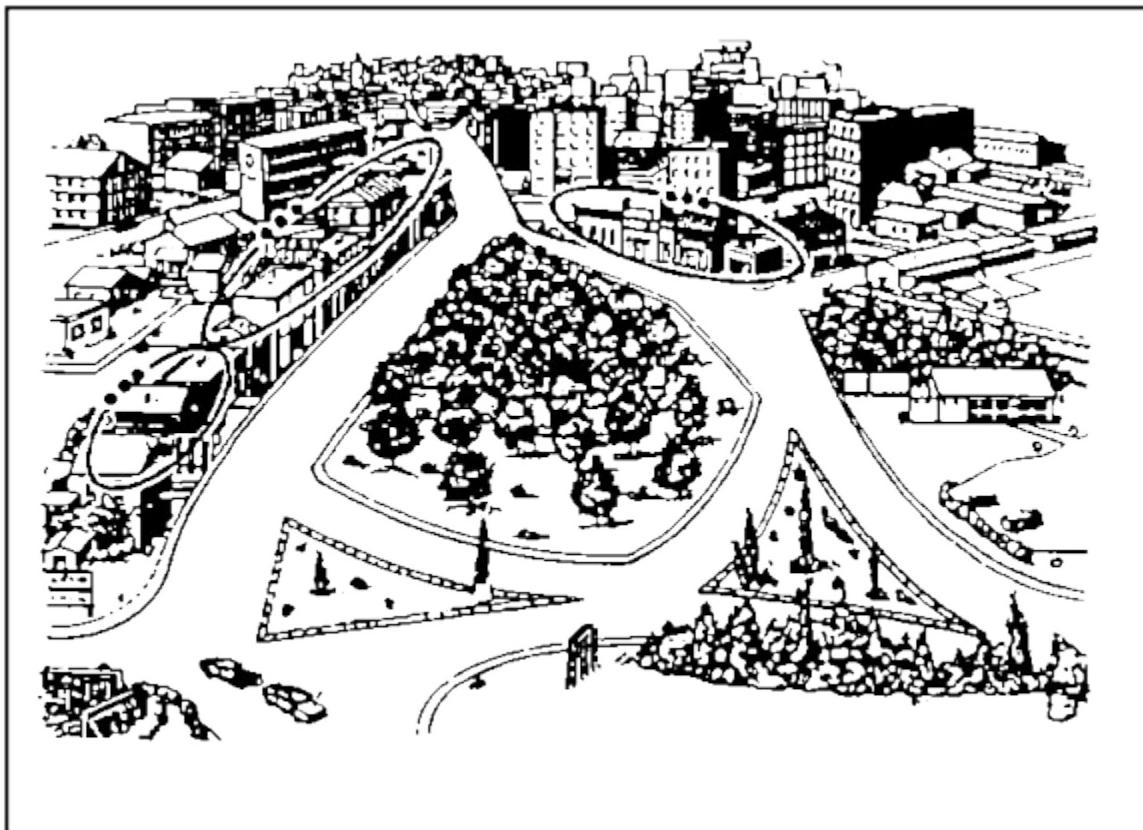


Figure 4-14. Defense of a traffic circle.

- b. Obstacles can also deny the enemy the use of the traffic circle. Obstacle planning in this case must consider if friendly forces are supposed to use the traffic circle. TOWs and Dragons can fire across the traffic circle if fields of fire are long enough. Tanks should engage enemy tanks and provide heavy direct-fire support for counterattacks. BFVs should engage BTRs, BMPs, and BRDMs and provide direct fire to protect obstacles.

DEFENSIVE PLAN AT PLATOON LEVEL

The defensive plan in built-up areas at platoon level is METT-T and ROE dependent.

1. Defense of a Strongpoint. One of the most common defensive tasks a platoon will be given is the strongpoint defense of a building, or a group of small buildings (see [Figure 4-15](#)). The platoon's defense is normally integrated into the company's mission (defense of a traffic circle, and so forth). The

platoon must keep the enemy from gaining a foothold in buildings. It makes the best use of weapons and supporting fires, organizes all-round defense, and counterattacks or calls for a company counterattack to eject an enemy that has a foothold. The platoon leader analyzes his defensive sector to recommend to the company commander the best use of obstacles and supporting fires.

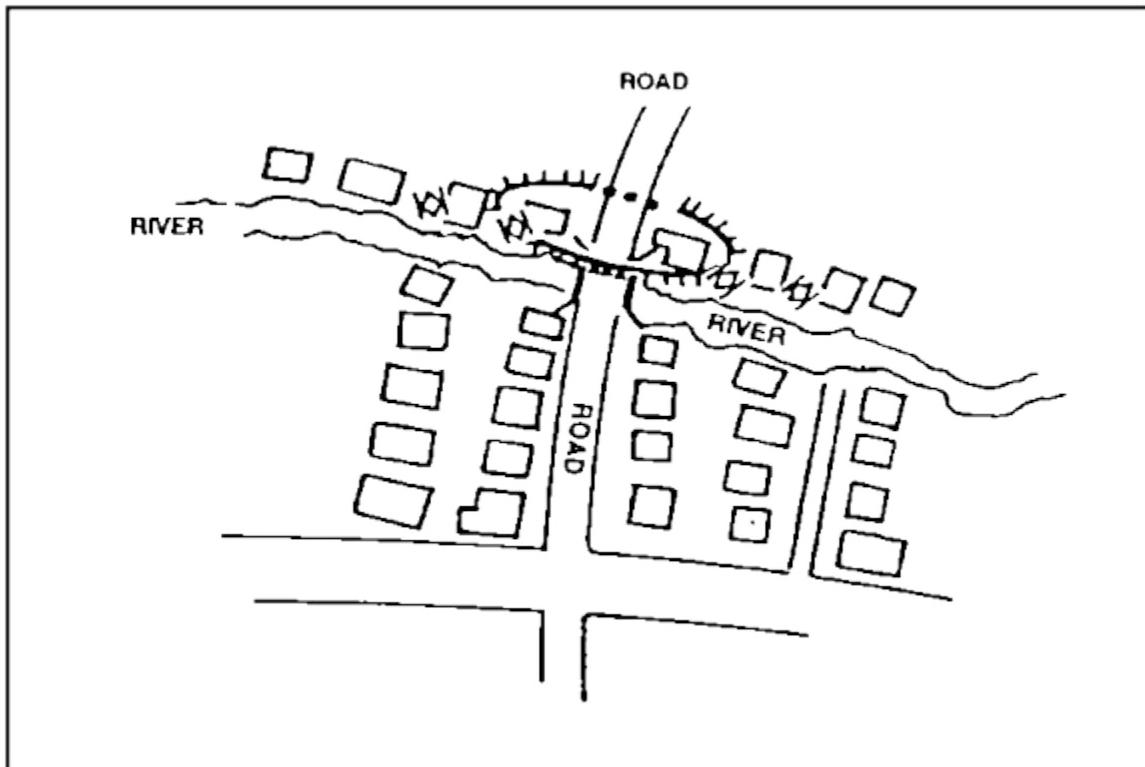


Figure 4-15. Defense of a strongpoint.

- a. The platoon should be organized into a series of firing positions located to cover avenues of approach, to cover obstacles, and to provide mutual support. Snipers may be located on the upper floors of the buildings. Unengaged elements should be ready to counterattack, fight fires, or reinforce other elements of the platoon.
- b. Depending on the length of the mission, the platoon should stockpile the following:
 - (1) Pioneer equipment (axes, shovels, hammers, picket pounders).
 - (2) Barrier material (barbed wire, sandbags).
 - (3) Munitions (especially grenades).
 - (4) Food and water.
 - (5) Medical supplies.
 - (6) Firefighting equipment.

2. Defense Against Armor. The terrain common to built-up areas is well-suited to an infantry's defense against mechanized infantry and armored forces. Mechanized infantry and armored forces try to avoid built-up areas but may be forced to pass through them. A well-trained infantry can inflict heavy casualties on such forces.

- a. Built-up areas have certain traits that favor infantry anti-armor operations.
 - (1) Rubble in the streets can be used to block enemy vehicles, conceal mines, and cover and conceal defending infantry.
 - (2) The streets restrict armor maneuver, fields of fire, and communications, thereby reducing the enemy's ability to reinforce.
 - (3) Buildings provide cover and concealment for defending infantry.
 - (4) Rooftops, alleys, and upper floors provide good firing positions.
 - (5) Sewers, storm drains, and subways provide underground routes for infantry forces.
- b. Anti-armor operations in built-up areas involve the following planning steps:
 - STEP 1: Choose a good engagement area.** Enemy tanks should be engaged where most restricted in their ability to support each other. The best way for infantrymen to engage tanks is one at a time, so that they can destroy one tank without being open to the fires of another. Typical locations include narrow streets, turns in the road, "T" intersections, bridges, tunnels, split-level roads, and rubbed areas. Less obvious locations can also be used by using demolitions or mines to create obstacles.
 - STEP 2: Select good weapons positions.** The best weapons positions are places where the tank is weakest and the infantry is most protected. A tank's ability to see and fire are limited to the rear and flanks, if the tanks are buttoned-up. [Figure 4-16](#) shows the weapons and visual dead space of a buttoned-up tank against targets located at ground level. Similar dead space exists against targets located overhead.
 - STEP 3: Assign target reference points and select method of engagement.** After selecting the weapons positions, assign target reference points (TRPs) to ensure coverage of the areas and as a tool in controlling fires. The TRPs should be clearly visible through the gunner's sights and should be resistant to battle damage (for example, large buildings or bridge abutments, but not trees or cars). The leader of the anti-armor operation should specify what type of engagement should be used, such as frontal, cross-fire, or depth. Frontal fire is the least preferred since it exposes the gunner to the greatest probability of detection and it is where the armor is the thickest. (For more information on target engagement techniques, see [FM 7-91](#) and [FM 23-1](#).)

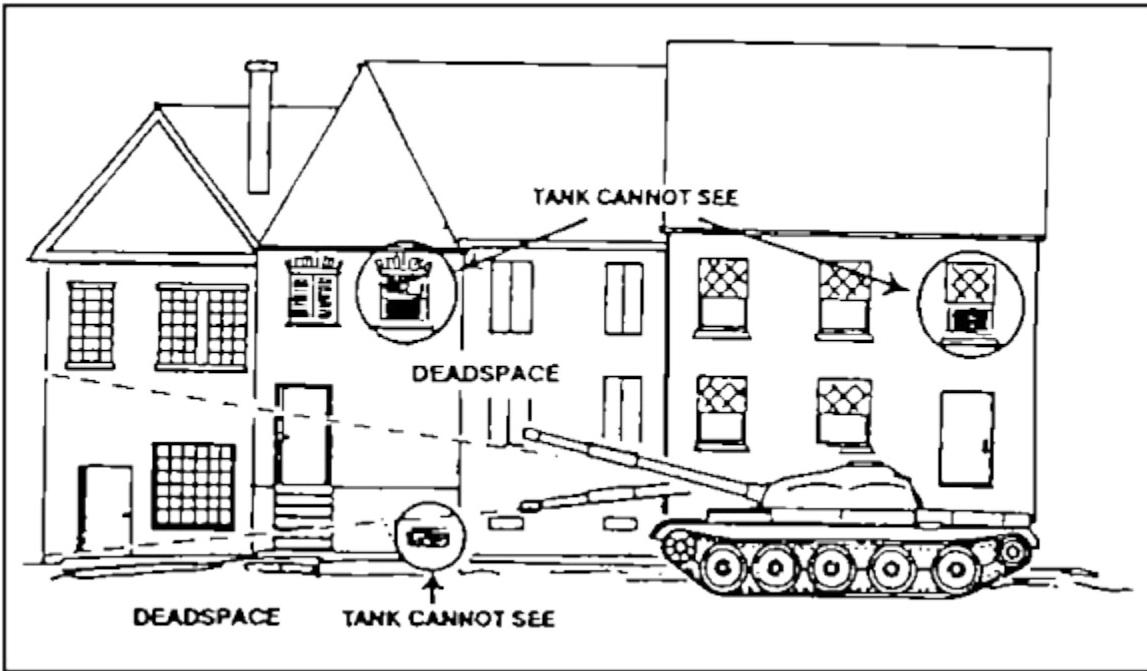


Figure 4-16. Tanks cannot fire at close-range, street-level, and overhead targets.

(1) To the infantry force, the best places to fire on tanks are at the flanks and rear at ground level or at the top of tanks if the force is in an elevated position in a building. A suitable anti-armor defense might be set up as shown in [Figure 4-17](#).

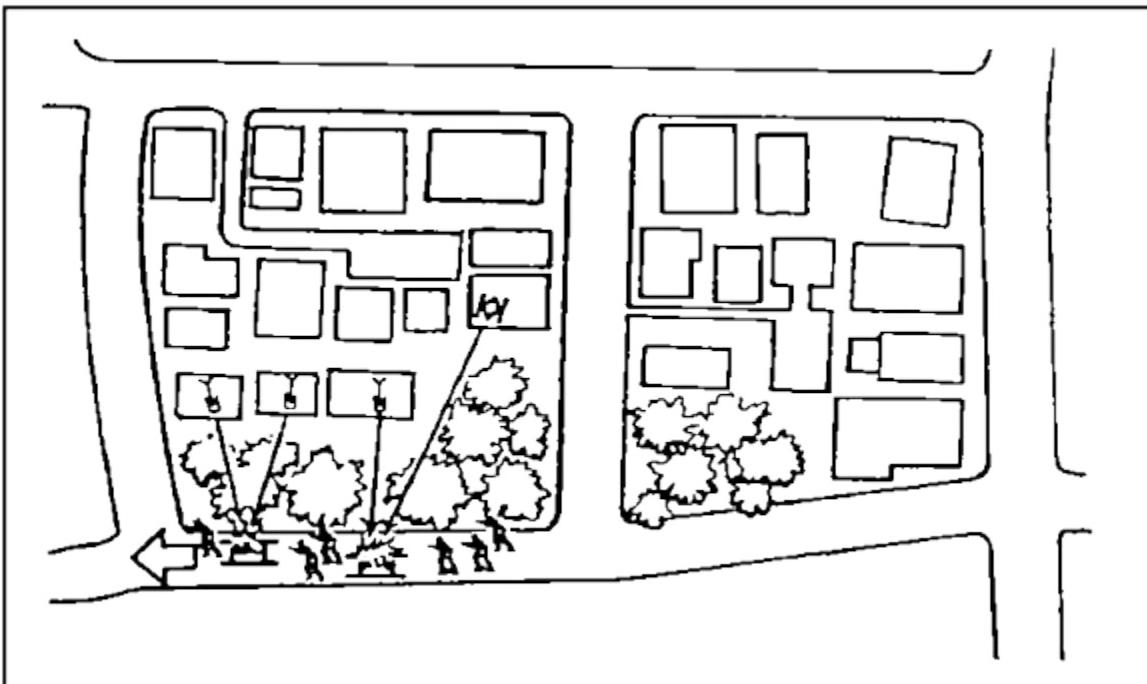


Figure 4-17. A platoon's anti-armor defense.

(2) The best place to engage a tank from a flank is over the second road wheel at close range. This can be done using a corner so that the tank cannot traverse the turret to counter-attack.

(3) For a safe engagement from an elevated position, infantrymen should allow the tank to approach to a range three times the elevation of the weapons.

(4) To engage at a longer range is to risk counterfire, since the weapon's position will not be in the tank's overhead dead space. However, overhead fire at the rear or flank of the tank is even more effective. Alternate and supplementary positions should be selected to enforce all-round security and to increase flexibility.

STEP 4: Coordinate target engagement. Tanks are most vulnerable when buttoned up. The first task of the tank-killing force is to force the tanks to button-up, using all available direct and indirect fire. The proper use of fire control measures and graphics will greatly diminish the probability of fratricide. The next task is to coordinate the fires of the antitank weapons so that if there is more than one target in the engagement area, all targets are engaged at the same time.

c. Armored vehicles are often accompanied by infantry in built-up areas. Anti-armor weapons must be supported by an effective all-round antipersonnel defense ([Figure 4-18](#)).

d. At a planned signal (for example, the detonation of a mine) all targets are engaged at the same time. If targets cannot, they are engaged in the order of the most dangerous first. Although tanks present the greatest threat, BMPs are also dangerous because their infantry can dismount and destroy friendly anti-armor positions. If the friendly force is not secured by several infantrymen, priority of engagement might be given to enemy APCs. Rubble and mines should be used to reduce target mobility to present more targets to engage.

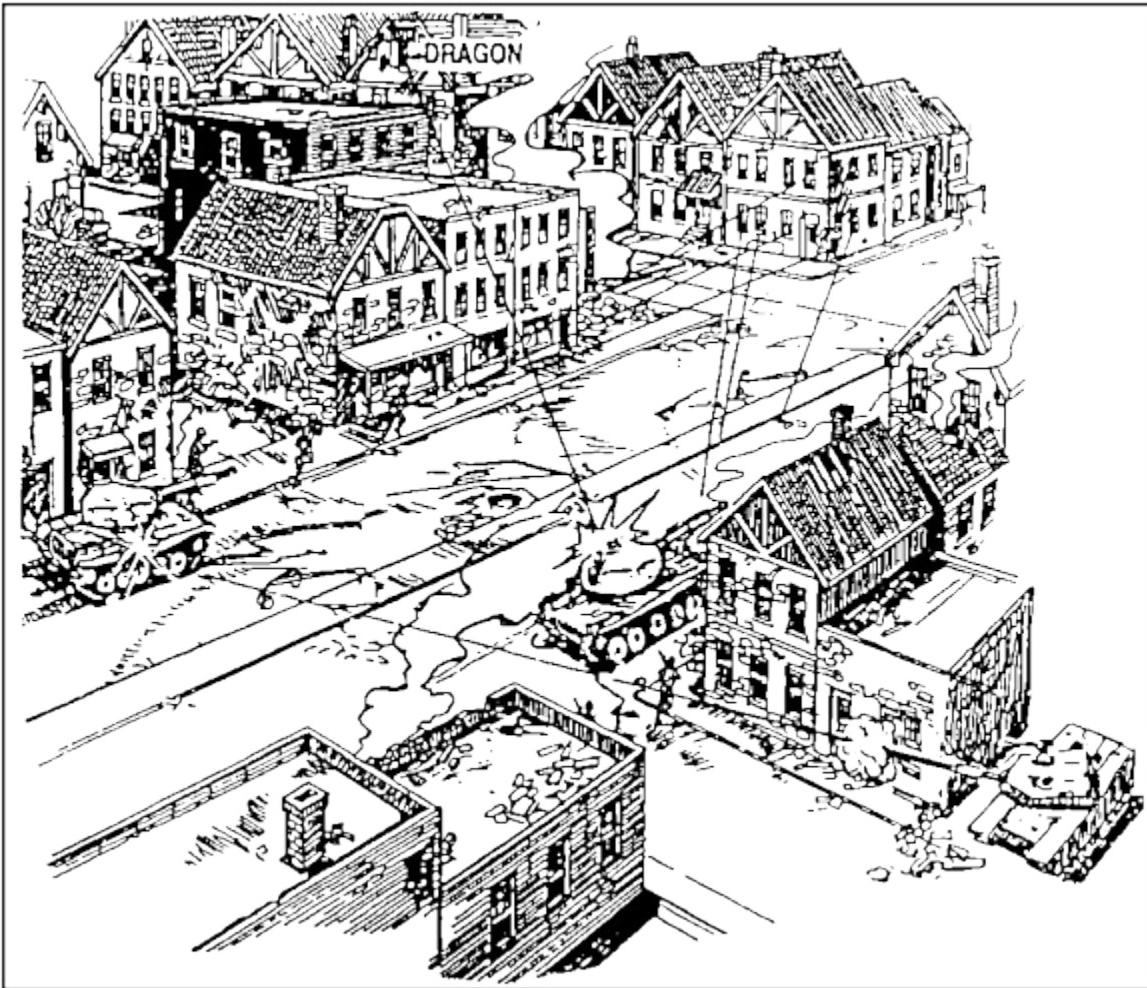


Figure 4-18. Coordinated anti-armor ambush.

3. Conduct of Armored Ambush. A rifle company can use an attached tank platoon to conduct an armored ambush in a built-up area ([Figure 4-19](#)). To do so, the tank platoon should be reinforced with a BFV or APC and one or two squads from the rifle company. The ambush can be effective against enemy armor if it is conducted in an area cleared and reconnoitered by friendly forces

- a. The operation involves maneuver on a road network that is free of obstacles. Obstacles outside the ambush area can be used to canalize and delay the enemy. The ambushing tank platoon must know the area.
- b. The ambushing tanks should be located in a hide position situated about 1,000 meters from the expected enemy avenue of approach. A security post, located at a choke point, observes and reports the approach, speed, security posture, and activity of the enemy. This role is assigned to a scout who uses the BFV, ITV, or APC to move from OP to OP. When the enemy is reported at a trigger point or TRP, the tank platoon leader knows how much he must move his tanks to execute the ambush.

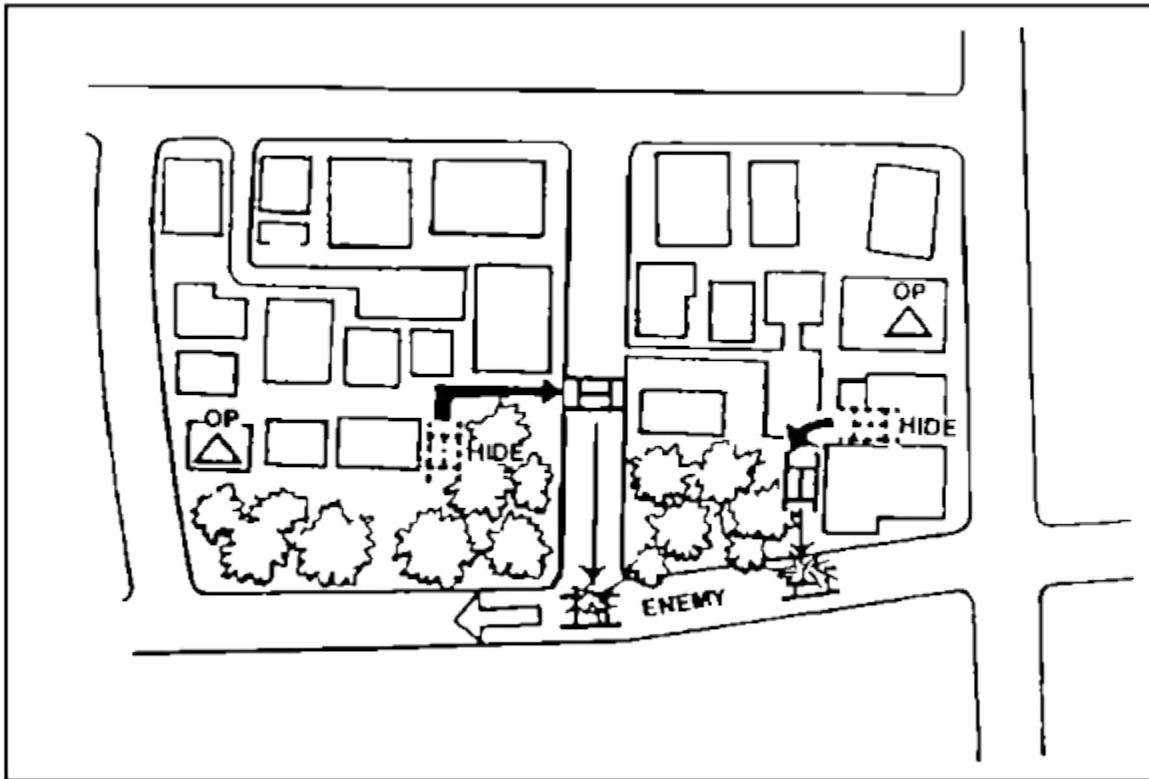


Figure 4-19. Armored ambush.

- c. The tanks move quickly from their hide positions to firing positions, taking advantage of all available concealment. They try for flank shots on the approaching enemy - the average range is 300 to 400 meters. Such long ranges do not expose tanks to the enemy infantry. Once the enemy is engaged, tanks break contact and move to a rally point with close security provided by an infantry squad. They then move to a new ambush site.

Lesson 4

Practice Exercise

Instructions The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

1. A commander may decide not to defend a built-up area if one of the following conditions exist.
 - A. Does not have enough personnel to defend the built-up area.
 - B. His desire to close with the enemy, changes the mission.
 - C. Is denied tank support.
 - D. Nearby terrain allows the enemy to bypass on covered or concealed routes.
2. What should the defense of a built-up area be organized around?
 - A. His armored vehicles.
 - B. Key terrain.
 - C. Special troops.
 - D. The commanders command post.
3. Why is it unwise to defend a village that allows easy bypass and offers no defendable terrain to units defending it?
 - A. Because cover and concealment would be unavailable.
 - B. The enemy could use air power to drive you out.
 - C. This would allow friendly forces to be easily bypassed and cut off.
 - D. Reinforcements could not gain entrance into the area.
4. What is the normal frontage when employing a company or company team to defend a built-up area?
 - A. One to two city blocks.
 - B. Two to three city blocks.
 - C. Two to four city blocks.
 - D. Four to five city blocks.

5. During the battalion TF's defense, the guard force, should do what?
 - A. Call in for a smoke screen of the area.
 - B. Concentrate on causing the enemy to deploy without engaging the enemy in decisive combat.
 - C. Engage the enemy decisively.
 - D. Fire on the approaching enemy, causing them to turn away from your defensive positions.
6. When choosing a good engagement area, what is the best way infantrymen should engage tanks?
 - A. Alternating fires.
 - B. In pairs.
 - C. One at a time.
 - D. Salvo firing.
7. You are occupying an antiarmor defensive position at ground-level, an enemy tank has just moved within 100 meters of your position and has presented its flank to you. Where is the best place to engage this tank?
 - A. At the center of the turret.
 - B. At the center of the hull.
 - C. At the main gun.
 - D. Over the second road wheel.
8. Tanks support the platoon by engaging enemy tanks, providing reinforcing fires, aiding the disengagement of the platoons, and
 - A. Acting as transports for the infantry.
 - B. Covering obstacles by fire.
 - C. Engages other armored vehicles.
 - D. Provides the shock effect needed for counterattacks.

Practice Exercise

Answer Key and Feedback

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 - C. Is denied tank support.

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 - B. Covering obstacles by fire.
 - C. Engages other armored vehicles.
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